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GEORGE W. FULLER

Sixteenth Annual Report

OF THE

State Board of Health

OF THE

STATE OF OHIO

FOR THE

YEAR ENDING OCTOBER 31, 1901.

COLUMBUS, OHIO:
FRED. J. HEER, STATE PRINTER
1902.

LETTER OF TRANSMITTAL.

OHIO STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY.

COLUMBUS, May 8th 1902.

To His Excellency, GEO. K. NASH, *Governor of Ohio.*

SIR: — In accordance with Section 8 of an "Act to create and establish a State Board of Health," the accompanying report is herewith submitted. The report of the work of the Board proper is for the year ending October 31, 1901. The reports of local boards of health, the mortality reports, and the report of work in the laboratory, is for the year ending December 31, 1901.

Respectfully,
C. O. PROBST,
Secretary.

MEMBERS OF THE OHIO STATE BOARD OF HEALTH.

	TERM EXPIRES.
*Wm. T. Gemmill, M. D., *President*, Forest	December. 1901
Byron Stanton, M. D., *Vice President*, Cincinnati	December, 1902
J. C. Crossland, M. D., Zanesville	December, 1903
Wm. T. Miller, M. D., Cleveland	December, 1904
Frank Warner, M. D., Columbus	December, 1905
W. C. Chapman, M. D., Toledo	December, 1906
Josiah Hartzell, Ph. D., Canton	December, 1907
C. O. Probst, M. D., *Secretary*.	

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* April 30th, 1902, Dr. Darwin G. Palmer, of Geneva, was appointed to succeed Dr. Gemmill.

GENERAL REPORT.

This is the sixteenth annual report of the State Board of Health. The report, in accordance with the provisions of the Act establishing the Board, is for the year ending October 31, 1901. The reports of local boards of health, the monthly mortality statistics of cities, and the work of the laboratory, is for the year ending December 31, 1901.

PERSONNEL OF THE BOARD.

There have been no changes in the personnel of the Board since the last report.

MEETINGS.

Six meetings were held during the year. A report of the proceedings will be found further on.

At the January meeting the eleventh annual conference with local boards of health was held. This meeting was the largest yet held, nearly four hundred delegates being present.

SMALLPOX.

The smallpox epidemic, as predicted in former reports, has continued. The disease has maintained the same mild character it has shown from the commencement, the deaths during the year having been only 1.18 per cent of the cases reported.

It is worthy of note, as bearing upon the discussion of the causes of the mildness of the epidemic in the United States and Canada, that smallpox, now prevailing in London, England, has not been shorn of its usual malignancy.

It is impossible to stop this epidemic by any system of quarantine. Many cases never come to the attention of the authorities, having had no medical attendance, or, if discovered, not until weeks, sometimes months after they occurred. Another class of cases are not recognized as smallpox by the attending physician, and are not reported for quarantine. Only general vaccination and revaccination would bring the epidemic to a close, and it is impossible to secure this.

It is to be remarked that with the exception of Cleveland the great bulk of the cases so far have been in villages and rural districts. The reason for this, apparently, is that our cities generally have well organized boards of health, prepared to deal promptly with the first outbreak.

Smallpox has been repeatedly introduced into a number of cities, but has been promptly suppressed.

During the year ending December 31, 1901, there were 4,880 cases and 58 deaths from smallpox reported to the Board. These were distributed by counties and places as follows:

CASES AND DEATHS OF SMALLPOX REPORTED TO THE STATE BOARD OF HEALTH FROM JANUARY 1, TO DECEMBER 31, 1901.

County.	Place.	Cases.	Deaths.
Adams	Bratton Township	1	....
	Jefferson Township	26	1
	Meigs Township	1	....
Allen	Beaver Dam	1	....
	Lima	1	....
	Perry Township	1	....
	Richland Township	5	....
Ashland	Clear Creek Township	4	....
	Green Township	6	....
	Lake Township	5	....
	Ruggles Township	4	....
	Vermillion Township	3	....
Ashtabula	Ashtabula	37	....
	Saybrook Township	11	....
Athens	Glouster	6	....
	Trimble Township	14	....
Auglaize	Duchouquet Township	1	....
	Moulton Township	1	....
	St. Marys	8	....
	Union Township	1	....
	Wapakoneta	2	....
Belmont	Barnesville	14	....
	Bellaire	10	....
	Bridgeport	5	....
	Martins Ferry	6	....
	Mead Township	1	....
	Pease Township	6	....
	Richland Township	29	....
	St. Clairsville	3	....
	Warren Township	1	....
	Wheeling Township	2	....
Brown	Georgetown	2	....
	Pleasant Township	2	....
	Ripley	5	....
Carroll	Brown Township	1	....
	Malvern	1	....
	Rose Township	3	1
Champaign	Urbana	7	....
	Urbana Township	1	1
Clark	Harmony Township	5	....
	Springfield	8	....
Clermont	Batavia	2	....
Columbiana	Miami Township	1	....
	Knox Township	1	....
Coshocton	Wellsville	2	....
	Jefferson Township	6	....
	White Eyes Township	75	....

CASES AND DEATHS OF SMALLPOX REPORTED, Etc. — Continued.

County.	Place.	Cases.	Deaths.
Crawford	Auburn Township	6	....
	Crestline	16	....
	New Washington	2	....
Cuyahoga	Bedford Township	7	....
	Berea	24	....
	Brooklyn Township	3	....
	Chagrin Falls	2	....
	Cleveland	1,183	20
	Cleveland Heights	1	....
	Collinwood	7	....
	Glenville	14	....
	Lakewood	8	....
	Mayfield Township	15	....
	Middleburg Township	72	....
	Newburgh	32	1
	Olmsted Township	11	....
	Orange Township	4	....
	Parma Township	4	....
	Rockport	2	....
	Rocky River	14	1
	South Brooklyn	1	....
	Warrensville Township	6	....
	West Park	1	....
Darke	Jackson Township	9	....
	Union City	53	....
Defiance	Adams Township	18	....
	Hicksville Township	18	....
	Mark Township	3	....
	Richland Township	6	....
Delaware	Delaware	4	....
	Radnor Township	4	....
Erie	Berlin Township	1	....
	Sandusky	8	....
Fairfield	Lancaster	1	....
Fayette	Bloomingburg	8	....
Franklin	Columbus	25	....
	Pleasant Township	25	....
	Sharon Township	1	....
Gallia	Addison Township	4	....
	Cheshire Township	1	....
	Clay Township	2	....
	Gallipolis	17	....
	Green Township	5	....
	Greenfield Township	2	....
	Harrison Township	1	....
	Morgan Township	7	....
	Springfield Township	24	....
	Walnut Township	2	1
Geauga	Auburn Township	1	....
	Burton	1	....
	Burton Township	8	....
	Chester Township	5	....
	Newbury Township	14	....
Greene	Cedarville Township	1	....
	Spring Valley	1	....
	Xenia	1	....
Guernsey	Cambridge	14	....

CASES AND DEATHS OF SMALLPOX REPORTED, Etc. — Continued.

County.	Place.	Cases.	Deaths.
Hamilton	Cincinnati	137	1
	Hartwell	2	....
	Mill Creek Township..........................	1	....
	Norwood	4	....
	Pleasant Ridge	1	....
	Symmes Township	2	....
Hancock	Allen Township	1	....
	Findlay	51	2
	Washington Township	3	....
Hardin	Ada	10	....
	Dunkirk	14	....
	Kenton	21	....
	Liberty Township	1	....
	Lynn Township	3	....
	McDonald Township	155	....
	Pleasant Township	3	....
Harrison	Harrisville	3	....
	Hopedale	1	....
	Pike Township	1	....
	Short Creek Township......................	5	....
Henry	Flat Rock Township........................	1	....
	Harrison Township	5	....
	Holgate	2	....
	Napoleon	5	....
Hocking	Logan	1	....
	Madison Township	2	2
	Ward Township	3	....
Huron	Bellevue	8	....
	Chicago	16	....
	Fitchville	4	....
	Greenwich	3	....
	Greenwich Township	10	1
	New Haven Township........................	7	....
Jackson	Coal Township	2	....
	Jefferson Township	23	....
	Lick Township	1	....
	Madison Township	6	....
	Oakhill	61	....
Jefferson	Mingo Junction	21	....
	Mt. Pleasant Township......................	1	....
	Steubenville	1	....
	Warren Township	21	1
	Wayne Township	9	....
Knox	Mt. Vernon	1	....
	Wayne Township	11	....
Lake	Grand River	3	....
	Madison	1	....
	Mentor	11	1
	Mentor Township	1	....
	Painesville	4	....
	Painesville Township	1	....
	Willoughby	1	....
Lawrence	Aid Township	10	....
	Elizabeth Township	6	....
	Ironton	62	....
	Madison Township	5	....
	Rome Township	2	....

CASES AND DEATHS OF SMALLPOX REPORTED, Etc. — Continued.

County.	Place.	Cases.	Deaths.
Lawrence — Concl'd..	Symmes Township	4	....
	Windsor Township	7	....
	Upper Township	3	....
Licking	Eden Township	1	....
	Hanover Township	15	1
	Mary Ann Township	2	....
	Newark	55	....
	Newton Township	1	....
	Utica	1	....
Logan	Belle Center	3	....
	Richland Township	3	....
	West Mansfield	2	....
Lorain	Black River Township	1	....
	Elyria	13	....
	Elyria Township	13	1
	Lorain	45	1
	Russia Township	8	....
	Sheffield Township	15	....
Lucas	Monclova Township	1	....
	Toledo	21	....
Mahoning	Coitsville Township	1	....
	Youngstown	16	....
Marion	Marion	1	....
Mercer	Butler Township	102	....
	Coldwater	139	....
	Franklin Township	4	....
	Granville Township	1	....
	Mendon	1	....
	Recovery Township	52	....
	Washington Township	3	....
Monroe	Benton Township	7	....
	Bethel Township	7	....
	Franklin Township	2	....
	Graysville	42	1
	Jackson Township	5	....
	Perry Township	6	....
	Washington Township	18	....
Montgomery	Butler Township	2	....
	Dayton	5	....
	Germantown	3	....
	German Township	1	....
	Jefferson Township	1	....
	Washington Township	8	1
Morgan	York Township	1	....
Morrow	Cardington	1	....
	Salem Township	5	....
Muskingum	Zanesville	1	....
Ottawa	Allen Township	1	....
	Carroll Township	5	....
	Genoa	1	....
	Marblehead	1	....
	Oak Harbor	27	1
Paulding	Antwerp	1	....
	Brown Township	2	....
	Crane Township	33	....
	Carryall Township	3	....
	Grover Hill	29	....
	Jackson Township	2	....

CASES AND DEATHS OF SMALLPOX REPORTED, Etc. — Continued.

County.	Place.	Cases.	Deaths.
Paulding — Concl'd..	Latty Township	13	....
	Paulding	1	....
Perry	Harrison Township	52	....
	New Lexington	4	....
	Pike Township	12	....
	Rendville	1	....
Pike	Scioto Township	2	....
Portage	Atwater Township	1	....
	Brimfield Township	1	....
	Ravenna	1	....
	Rootstown Township	17	....
	Shalersville Township	10	....
	Streetsboro Township	1	....
Preble	Gratis	41	....
Putnam	Blanchard Township	1	....
	Continental	3	....
	Dupont	11	....
	Perry Township	7	....
Richland	Blooming Grove Township	15	....
	Butler Township	23	....
	Cass Township	6	1
	Madison Township	18	....
	Mansfield	19	....
	Monroe Township	2	....
	Plymouth Township	3	....
	Shelby	5	....
	Shiloh	3	1
	Springfield Township	10	....
Sandusky	Clyde	2	....
	Fremont	1	....
	Gibsonburg	26	....
	Madison Township	6	....
	Sandusky Township	1	....
Scioto	Bloom Township	3	....
	Clay Township	36	....
	Green Township	4	....
	Harrison Township	6	....
	Madison Township	4	....
	Morgan Township	11	....
	Otway	57	....
	Porter Township	5	....
	Portsmouth	72	2
	Union Township	20	....
	Washington Township	36	2
Seneca	Fostoria	3	....
	Loudon Township	6	....
	Tiffin	1	....
Shelby	Clinton Township	16	....
	Green Township	37	....
	Jackson Center	14	....
	Orange Township	1	....
	Perry Township	2	....
	Sidney	36	....
Stark	Canton	8	....
	Massillon	1	....
	Sandy Township	15	2
	Waynesburg	1	....

CASES AND DEATHS OF SMALLPOX REPORTED, Etc. — Concluded.

County.	Place.	Cases.	Deaths.
Summit	Hudson	1	1
	Twinsburg Township	1	....
Trumbull	Bazetta Township	8	1
	Champion Township	8	....
	Mecca Township	2	....
Tuscarawas	Fairfield Township	4	....
	Mineral City	8	2
	New Philadelphia	1	....
	Rush Township	1	....
	Uhrichsville	3	....
Union	Leesburg Township	1	....
	Magnetic Springs	1	....
Van Wert	Harrison Township	9	....
	Liberty Township	1	....
	Scott	5	....
	Tully Township	2	....
	Van Wert	6	1
Vinton	Brown Township	1	....
	Madison Township	4	....
	Vinton Township	31	1
Washington	Barlow Township	22	....
	Belpre Township	7	....
	Decatur Township	3	....
	Dunham Township	9	1
	Liberty Township	13	....
	Marietta	18	....
Wayne	Creston	6	....
Williams	Alvordton	1	....
	Edon	6	....
	Florence Township	2	....
	Madison Township	10	....
	Millcreek Township	1	....
	Montpelier	1	....
	Northwest Township	68	....
	Stryker	15	....
Wood	Center Township	10	....
	Henry Township	78	....
	Freedom Township	53	....
	Jerry City	1	....
	Lake Township	1	....
	Middletown Township	19	....
	Montgomery Township	2	....
	North Baltimore	11	....
	Pemberville	53	1
	Perrysburg Township	1	....
	Portage	7	....
	Troy Township	31	2
	Webster Township	44	....
Wyandot	Antrim Township	1	....
	Carey	1	....
Total — Counties 75	Places 326	4,880	58

WATER SUPPLIES AND SEWERAGE.

Plans for water supplies, or for changes or additions thereto, for the following places, were presented to the Board for approval, to wit: Coshocton, Cuyahoga Falls, Geneva, Ironton, Mantua, Newark, Plymouth, Salineville, Wellsville, and Woodsfield.

These were all approved except for Cuyahoga Falls and Ironton. The Board disapproved an emergency intake for Cuyahoga Falls. Water was to be obtained from the Cuyahoga River, to be used only for fire emergencies. An examination of the river at the site of the proposed intake showed the river water to be polluted and unsafe for domestic use. While the Board realizes the necessity of having at command an abundant supply of water for such emergencies, experience has shown that in very many cases these emergency intakes have been made use of to augment a failing supply, and in some instances have come into almost constant use. When the emergency supply is dangerously polluted it is believed to be a much better policy to provide in the beginning, by increased storage or other means, for the occasional extraordinary demands.

In the case of Ironton it was proposed to augment the supply by the use of wells, located within the city. The results of an examination of a sample of water from the proposed supply, in connection with the unfavorable surroundings of the wells led the Board to disapprove of it.

Plans for sewerage or sewage disposal works for the following places were presented for approval, to wit: Ashland, Celina, Columbus, Conneaut, Delaware, Findlay, Greenfield, Jackson, Kent, Maumee, Plain City, Sidney, Toledo (Walbridge Park), Upper Sandusky and Zanesville.

These were approved with the exception of the following:

The plans for sewerage for District No. 36 of Toledo were disapproved, unless satisfactory sewage disposal works are provided.

Plans for a sewerage system for the village of Maumee were disapproved. In this case it was proposed to discharge unpurified sewage into the Maumee River a few miles above the intake for the water supply of the city of Toledo.

A serious problem was presented to the Board in passing upon plans for sewage disposal for the city of Columbus. Injunction suits were pending against the city of Columbus to prevent the pollution of the Scioto River by sewage. A sewerage commission was appointed, and plans for disposing of the sewage by septic tanks without further treatment were presented to the Board for approval. After careful investigation and consideration the Board voted to disapprove the plans, believing that septic tanks alone would be inadequate to sufficiently purify the sewage.

INVESTIGATION OF SOURCES OF PUBLIC WATER SUPPLIES.

The investigation of sources of public water supplies, begun in 1897, was continued during the year 1901. The work was confined to water supplies obtained from the Ohio River and Lake Erie. Some interesting facts were developed as regards Ohio River supplies. These are referred to at length further on. This year's work will conclude the general survey, and hereafter attention will be especially given to localities which the preliminary examination has shown to need further study.

The Act of 1893 provides that the State Board of Health "shall examine and report annually the condition of all public supplies." The Board has now reported upon the source, and to some extent, upon the character, of all public water supplies, and has noted any changes or additions thereto of which it has gained knowledge. To carry out the full purpose of this Act will require examinations at short intervals of most of the water supplies of surface origin. The Board must have enlarged laboratory facilities and increased appropriations if this important work is to be fully prosecuted.

A full report of the investigation of public water supplies from Lake Erie and the Ohio River is published as an appendix to this report.

OHIO SOCIETY FOR THE PREVENTION OF TUBERCULOSIS.

The prevention of tuberculosis has more or less occupied the attention of the Board since its organization. It has constantly upheld the view that this disease is largely preventable and curable. But it has realized that preventive measures must necessarily be educational. In 1894 this question was brought to the attention of the medical profession by a circular letter sent to each physician. Eleven hundred and eighty-two answers were received. The compulsory notification of cases of tuberculosis having been advocated by various sanitarians, the Ohio physicians were requested to give their views on the subject. A little more than half of those who replied favored such reports. Less than half of the whole number (640) expressed the belief that this disease is communicable from person to person. The circumstances were given respecting 447 cases which had been caused, according to the authors belief, by contagion.

During this same year, 1894, the board published a pamphlet for general distribution on the prevention of consumption. All but 58 of the physicians who replied to the circular letter referred to, agreed to place copies of this pamphlet in families in which they were treating cases of turberculosis. They were supplied with copies of the pamphlet for that purpose. The pamphlet was widely distributed through other channels, and is still being circulated.

During the present year the question was brought forward of doing something more to accelerate the progress already made. The wonderful results obtained in the cure of tuberculosis in special hospitals, mostly in Europe but to some extent in this country, seemed likely to give an impetus to a popular movement, and the Board appointed a committee to take the preliminary steps, if found feasible, to organize an Ohio Society for the Prevention of Tuberculosis. A number of prominent physicians and laymen in various parts of the state expressed their willingness to join such a society. Accordingly a meeting for organization was called at the office of the State Board of Health on November 14, 1901. The meeting was well attended. The names of 259 persons were enrolled as charter members. The following officers were elected:

Hon. J. H. Outhwaite, Columbus, President; Mr. S. S. Knabenshue, Toledo, Vice President; Mr. R. M. Rownd, Columbus, Treasurer; Dr. Andrew Timberman, Columbus, Secretary; Dr. Benj. F. Lyle, Cincinnati, Financial Secretary.

Trustees.— Dr. Byron Stanton, Cincinnati; Dr. H. A. Toby, Toledo; Dr. C. O. Probst, Columbus; Dr. G. A. Doren, Columbus; Judge Gilbert H. Stewart, Columbus; Dr. A. H. Freiberg, Cincinnati; Dr. P. M. Foshay, Cleveland; Dr. W. J. Conklin, Dayton; Mr. Cady Staley, Cleveland.

The following are the suggestions relative to the duties of the committees appointed by the board of trustees of the Ohio Society for the Prevention of Tuberculosis:

COMMITTEE ON LEGISLATION.

This Committee should collect, as far as possible, National, State and Municipal Acts relating to the prevention of tuberculosis. Should endeavor to inform itself of the practical working of such acts. Should report to the Society from year to year with recommendations for desirable legislation, state and municipal, in tuberculosis. It should take cognizance of all bills introduced in the Ohio Legislature relative to this subject; and should formulate all bills recommended by the Society for presentation to the Legislature.

It should endeavor to secure action by councils and boards of health of various municipalities, in adopting and enforcing suitable regulations, approved by the Society, looking towards the prevention of tuberculosis.

COMMITTEE ON AUXILIARY SOCIETIES.

This Committee should formulate a plan for the uniform organization of auxiliary societies, municipal or county, if deemed desirable, and should seek to secure their establishment wherever possible. Should assist such societies, by suggesting practical measures for local work, and should keep itself informed of their operations. Opportunity should be given at annual meetings of the State Society for reports from auxiliary societies.

PRESS COMMITTEE.

This Committee, if possible, should have several newspaper men among its members. It should have in charge the collection and dissemination of information suitable for publication in the Press and Educational and Society Journals. It is suggested that the publication of actual occurrences in our own state be largely dealt with — the history of cases illustrating how tuberculosis is spread.

It should prepare for publication articles relating to sanatoria for the cure of tuberculosis. Should endeavor to have good reports published of all meetings of the State and Local Societies. Should aim to keep constantly before the daily press, in all possible ways, the fact that *Consumption* is both *Preventable and Curable*.

COMMITTEE ON PUBLIC INSTITUTIONS.

This Committee should investigate the prevalence of tuberculosis in State and County Institutions. It should endeavor to have those in charge, aiding them when possible, ascertain the cause of any undue prevalence of this disease. Should assist the Legislative Committee in formulating desirable legislative measures in bringing about needed reforms. Should, with the aid of those in charge, endeavor to formulate practical plans for separating, so far as possible, the tubercular from the non-tubercular inmates of such institutions, and for caring for the sputum, enforcing necessary disinfection, etc., as regards the latter class. Should bring to the attention of the authorities of such institutions the question of preventing the use therein of milk or meat from tubercular animals.

COMMITTEE ON SANATORIA.

This Committee should collect from all possible sources information concerning the location, plans, cost of construction, and maintenance, results of treatment, etc., of the various sanatoria for tuberculosis in this, and possibly other countries. It should cooperate with the Press Committee in having published suitable articles dealing with this phase of the subject, and with the Legislative Committee in formulating a Bill for a State Sanatorium, if the Society should ever decide to ask Legislature to establish such an institution. If the Society determines to request the appointment of a State Commission to investigate and report upon the feasibility of establishing sanatoria for tuberculosis, this Committee, with the Legislative Committee, should prepare, have introduced and endeavor to secure the passage of a suitable Bill to that end. It should investigate the feasibility, as regards climatic conditions, of successfully maintaining sanatoria in this State.

A "LECTURE BUREAU" COMMITTEE.

This Committee should secure as large a list as possible of the various societies and organizations that hold meetings where addresses on the various phases of the cure and prevention of tuberculosis would be suitable. It should arrange for as many such addresses as possible, and secure suitable speakers, within or without the Society, for that purpose.

COMMITTEE ON WORKSHOPS AND FACTORIES.

This Committee should inform itself, as far as possible, of the condition of workshops and factories where trades are carried on that are specially conducive to Consumption. It should study the needs of such places, and seek to interest employers in ameliorating existing evil conditions. It should cooperate with the Legislative Committee in formulating any advisable legislative measures for the proper protection of workmen against unnecessary exposure to danger from this disease. It should in an educational way (by personal appeal, by correspondence, by suitable literature), secure the cooperation of employers in preventing spitting upon the floor in workshops and factories and the dry sweeping of such places.

COMMITTEE ON PUBLICATION.

This Committee should assist the Secretary in preparing suitable leaflets for distribution, dealing with measures for the prevention of tuberculosis and in preparing the annual report of the Society for publication. It should collect, as far as possible, the reports and other printed matter issued by kindred societies. It should formulate a plan for the proper distribution of the leaflets of the Society, and aid the Secretary in the carrying out of such plan.

A COMMITTEE ON DONATIONS AND OTHER FINANCIAL AID.

This Committee should seek to provide financial support to enable the Society to carry on and extend its work. It should endeavor to secure Life Members. Should prepare forms by which persons may legally make bequests to the Society. It should consider and recommend to the trustees such measures as it deems advisable for increasing the revenues of the Society. Should the Society decide to endeavor to construct a sanatorium for tuberculosis, it should devise a method for soliciting donations for that purpose.

COMMITTEE ON ANIMAL TUBERCULOSIS.

This Committee should collect information of what is being done by the various states and municipalities of this and possibly other countries, to prevent the sale of milk and meat from tuberculous animals. With the Legislative Committee it should formulate desirable laws and ordinances for protection against this danger, and aid in securing their enactment. It should furnish to the Press Committee information enabling it to prepare for publication suitable articles dealing with this phase of the subject.

COMMITTEE ON SICK BENEFITS.

This Committee should endeavor to learn the amount paid out by workmen's organizations, fraternal societies, etc., on account of tuberculosis, with the view of encouraging, for financial reasons, the establishment of sanatoria.

While the Board of Trustees of the Ohio Society for the Prevention of Tuberculosis has reserved, for obvious reasons the right to approve the work of the above committees, yet it is desired by them that each committee should feel at liberty to prosecute such measures as it may deem wise and expedient for carrying out the purpose for which it was appointed.

The Secretary of the State Board of Health delivered the following address upon "Association for the Prevention of Tuberculosis":

ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS.

A profound knowledge of human character is summed up in the somewhat exaggerated expression, "one can get used to anything except hanging." We are prone to accept the conditions to which we are born, or insensibly drift, as the unavoidable. The pestilential diseases that come to us at long intervals, such as yellow fever and cholera, excite the greatest alarm because we are not used to them; and it is this very alarm that makes it possible to enforce measures which now give us almost perfect protection against them. The unusual incident of the kidnapping of Miss Stone has excited the interest of all people, and yet but one life, a precious one no doubt, is at stake.

The awful disaster at Johnstown, with its 3,000 victims, awakened the sympathies of the charitable world; and it is a matter of some pride that Ohio was among the first, if not the first state, to have troops and relief supplies upon the ground.

It was this *sudden* wiping out of so many lives that startled us. Let us try to realize, here, today, that every year in Ohio this pestilence that we have met to combat carries off twice this number of our citizens, selecting as its victims the high and the lowly, the rich and the poor, from among our young, adult population.

It has been firmly established by science that tuberculosis is both curable and preventable; and the way has been pointed out for the practical utilization of this momentous fact. Throughout the civilized world thoughtful men and women are discussing this subject. Associations are rapidly forming to aid in putting into effect measures which offer such great hopes for the saving of life and the prevention of suffering. Nations, states, and municipalities have taken up this movement. Through the offices of the Medico-Legal Society of New York such an association has recently been formed for North America.

You will not fail to see that the prevention of tuberculosis is much more far-reaching than the mere saving of life or the prevention of sickness. It means in so many cases the saving of the home; the saving and education of the children, who, by the sickness or death of parents, would otherwise be thrown helpless onto the world. It means the prevention of pauperism, of crime, and of many other evils inevitably following broken home relations, especially among the poor.

Society has also a selfish interest in this subject, for tuberculosis is no respecter of persons; and in working to lessen the prevalence of this everywhere present scourge, we are laboring for the protection of ourselves and of our loved ones.

The encouragement met with in soliciting members for this society has been most gratifying; and promises well for its future. No general canvass was made to obtain members. But few refusals were met with; and there is every prospect for the formation of a large, active society, if proper effort is made.

I have been requested to indicate some of the ways such a society may pursue in carrying out its purposes. The subject must necessarily be treated briefly from the lack of time, and with the omission of details.

In considering what may be done for the prevention of tuberculosis we must first have clear conceptions of the causes that produce it.

The direct cause of the disease is a microscopic vegetable parasite which, on gaining access to the body, and especially the lungs, rapidly multiplies and sets up conditions which usually destroy life. The indirect causes are multifarious, and are, in general, those that lower vitality in a way to create a favorable soil; that is, a condition of the bodily tissues that favors the growth of this particular parasite. Among the most prominent of these indirect causes are the breathing of vitiated air, i. e. bad ventilation, damp, dark, unhealthy dwellings; alcoholism; heredity; poor physical development, and insufficient or improper food. One rarely, if ever, *inherits* tuberculosis, but may inherit a body easily prone to the disease when exposed to its exciting cause, the parasitic germ.

In consumption, or tuberculosis of the lungs, the most common and at the same time, to the public, the most dangerous form of the disease, this germ is found only in the sputum. It is the drying and dissemination of this that spreads the disease. The whole problem would be practically solved if every consumptive could be induced or compelled to destroy or disinfect this sputum as soon as it is expectorated.

This is one of the tasks, then, to which such a society should lend itself. It cannot be hoped, of course, that every consumptive will be reached or controlled, but large numbers of them may be if this work is seriously undertaken.

It is from ignorance rather than willfulness that the majority of consumptives are careless in the matter of expectoration. It is this ignorance, therefore, that is to be removed by every means possible.

The anti-spitting movement is of this character, though in this country it has usually taken the direction of compulsion — by law — rather than by education. In France you may see in the compartments of each passenger car a notice to the effect that the sanitary authorities have declared that disease may be communicated by spitting upon the floor, and *advising* against it. A few of our railroad companies have adopted a somewhat similar notice. Why should spitting not be prohibited in all public places?

But this crusade against a filthy, dangerous, habit needs to be carried into the home and workshop of the patient. The consumptive in his workshop may be reached through his employer. His companions could be instructed, by a leaflet, of the danger of such a person spitting upon the floor. Signs, forbidding it, should be posted in every workshop and factory. The employer should be interested in the society, if possible, and induced to provide cuspidors, and be instructed in the manner of having them disinfected.

The dry sweeping of the floors of workshops or rooms occupied by many persons is dangerous, filling the air with dust which may be infected with the germs of tuberculosis. Moist cleaning should be the rule in all such places. We should convince the employer of this.

All the trades in which men are compelled to work in an atmosphere ladened with irritating dust, as in dry-grinding, polishing, etc., are highly conducive to consumption. The society might greatly strengthen the hands of the Inspector of Workshops and Factories by securing legislation to compel the introduction of dust removing appliances in all such trades.

It will be more difficult to reach the consumptive in his home. How are we to gain knowledge of such cases?

There is still considerable opposition to requiring physicians to report cases of consumption. At the recent British Congress for the Prevention of Tuberculosis, with delegates present from practically all civilized countries, a resolution to require such reports was adopted. At a meeting, last September, of an association representing the State and Provincial Boards of Health of North America, a similar resolution was adopted. New York City has enforced such a rule, and with excellent results, for several years.

It is not intended that the health authorities, on receiving such a report, will attempt to restrict the liberty of the patient. Nor is it necessary to give public notice of the case. It gives opportunity, however, to place proper instructions in the hands of the family. It also enables the health authorities to disinfect the rooms in which such patients have lived or died, which is highly necessary.

This Society can aid in shaping public opinion to demand such reports. It can assist the health authorities in instructing such patients in the care to be taken to protect those about them. Above all, it can, in time, educate the whole mass of our people to the view that consumption is a dangerous contagious disease, easily preventable by measures which only the criminally careless will ignore. Strong public opinion is the best form of compulsion.

But this is not to be merely a tract distributing society. Something more than advice, we may hope, may finally be offered to such of these poor unfortunates as are obliged to live under conditions which render such precautionary measures almost impossible. Hospitals may be built, by the state, by municipalities, by this Society with the aid of philanthropists who need only to be convinced of the returns such an investment would bring. This phase of the subject will be spoken of later.

The educational features of the work (and these are nearest to hand) and which will, perhaps, in the long run, bring the largest returns, may take various directions. The press should and will, I believe, be a powerful ally. The society could have prepared for publication from time to time, terse, pertinent articles, showing how the disease is spread, and how this may be prevented. Examples from real life, and these are but too plentiful, would attract most attention. By committee, or otherwise, a large number of our newspapers, educational journals, etc., could be induced to publish these notices.

The English Society for the Prevention of Tuberculosis publishes a journal of its own, which is widely distributed.

A Lecture Bureau could be established. For example, the State Board of Health two years ago had lectures given at the majority of the Farmers' Institutes, on tuberculosis in animals and means for its prevention. They were favorably received and excited much interest. I have no doubt that workmen's clubs, teachers' institutes, and various other societies, may be found that would warmly welcome an interesting lecturer on this subject.

The society may well consider the question of some instruction in the public schools in the cause and prevention of tuberculosis, especially in the advanced grades, and in colleges and universities. Means for securing better ventilation of school houses, and all questions relating to the physical education of school children, are matters in which the society should exert its influence. Much may be done in the schools towards building up a strong race of men and women, able to resist the causes of tuberculosis, and this side of the question of prevention is worthy of most careful consideration.

Other channels, not indicated, for gaining the public ear, will occur to you, or will be opened up as the work advances.

A part of the work of the society, that might have been spoken of first, is to secure interested, active members throughout the state. It is here that, individually, each member can most easily aid the society. Each of us will know of those who would gladly join this movement. By personal solicitation and by furnishing the Secretary with a list of the names of those to whom a letter of invitation and membership blank may be sent, the ranks could be quickly swelled.

It is quite probable that many auxiliary societies could be formed, which would advance the interests of the society locally. Such societies could have their own officers, but should not, I think, be independent of the State Society.

Along the lines of prevention, the society ought to turn its attention towards the State and County Institutions. The frightful mortality from consumption in the penitentiary is notorious. During the last ten years 327 deaths from all causes have occurred there, and of this number 108, or more than 33 per cent. were from tuberculosis. An unknown but undoubtedly large number have contracted the disease there and died elsewhere after their discharge. A considerable number of prisoners have been pardoned because of their being fatally affected with this disease. During the ten years spoken of there were 435 admissions to the hospital on account of tuberculosis. In the hospitals for insane the disease is less prevalent, although deaths from consumption are there by far too common. Nothing has been done in Ohio, I believe, in the matter of separating the tubercular from the non-tubercular inmates of public institutions. It has been demonstrated elsewhere that this is not impossible. Legislation may be needed to do all that should be done in this matter, and the society could no doubt assist those in authority in bringing about a better state of affairs in the State and County Institutions.

A phase of the question that should not be entirely passed over is the prevalence of tuberculosis in food producing animals, and the consequent danger to man. The recent utterances of Koch, the discoverer of the cause of tuberculosis, that the disease is probably not communicable from animals to man, have excited great attention. His views have nowhere been accepted although former opinions have been somewhat shaken. We should certainly, until his statements are shown to be true beyond the shadow of doubt, continue to guard ourselves in every way possible against the use of milk or meat from tubercular animals.

The National Government inspects all meat sent abroad, and from one state to another. It annually destroys the carcasses of many thousands of beeves and hogs, found to be tubercular. We have practically no protection against meat from tubercular animals slaughtered within our borders, and none from tubercular milk. Even if it should eventually be shown that there is little or no danger of tuberculosis from this source, the use of meat or milk from diseased animals is repugnant to our ideas of health and decency, and should be made impossible. The society should use its influence to secure the proper inspection of meat and milk producing animals.

The means of furthering the object of the society remain to be considered, that is, the establishment of sanatoria or hospitals for the treatment and cure of tuberculosis. It will perhaps be advisable to speak briefly of what has and what can be done by such institutions. The subject could be treated at great length, but time will not permit.

Twenty years ago to tell a man that he had consumption was to practically read him his death warrant, although persons in all time have recovered from this disease. To-day, we may say to him, if the disease is just commencing that his chances for recovery are at least equal; that is, that under favorable conditions 50 per cent. of incipient cases can be cured. By cured is meant that they are returned to their homes strong, ready for work, and free from all symptoms of the disease. Many such cases have been followed for eight to ten years after leaving the hospital, and the great majority have remained well. From 20 to 30 per cent. of those who are not entirely cured are so much improved that they are able to return to work. The average stay in the hospital to accomplish these wonderful results is not to exceed three or at most four months.

There are already a number of hospitals for tuberculosis in Europe, and others are being constructed. Massachusetts has a State Hospital for such patients, and New York has appropriated money for this purpose. Many of these hospitals are private, accessible only to those of means. There is a free hospital for consumptives in Ohio at Cincinnati. All cases of consumption coming to the General Hospital are sent to this branch hospital, located outside of the city. Naturally, it is the poor, broken-down subjects, well advanced in the disease, who usually apply for admission to the general hospital; but even many of these cases are benefited and enabled to return to work.

The cost of taking care of such patients is but little more in a special hospital than in a general hospital. In the latter there is but little hope of benefit, and considerable danger of other patients and nurses becoming infected.

It is to be remarked that in special hospitals for consumptives drugs enter very slightly into the treatment of cases. An abundance of pure air, day and night, a sufficient quantity of nourishing food, graduated exercises suitable to each case, and proper clothing, these are the means relied upon to cure the disease. The most essential, pure out-of-door air, is practically unobtainable in a general hospital.

Until recently exaggerated ideas of the effects of certain climates in this disease were entertained. Modern experience has shown that hospitals for tuberculosis may be successfully conducted in almost any climate. There are undoubtedly many favorable spots for such institutions in our own state.

The dual purpose of such hospitals must not be lost sight of. Not only do they offer the opportunity for curing those who must otherwise shortly die of tuberculosis, but they are active agents in preventing the spread of the disease. Among the very poor, huddled into close quarters, it is almost impossible to prevent other members of the family from becoming affected. To remove such cases to a hospital is to remove a most dangerous center of infection. In another way these hospitals are very helpful. Those who return to their homes improved or cured carry with them their habits of prevention, and become educators of others with whom they come in contact.

There would seem to be the necessity, therefore, for two classes of hospitals. One for incipient cases, where a cure may be hoped for; the other for the isolation and cure of cases which from their surroundings are a special menace to the community, and of advanced cases without a home. Hospitals for the cure of tuberculosis should probably be State Institutions, though not necessarily established or maintained by the State government, while hospitals for the isolation and cure of the practically incurable cases should be municipal or county institutions, or both.

It could be shown that it would be a good investment from a purely financial standpoint for a large city to have such an isolation hospital. In the admirable report drawn up for the city of Edinburg, by the Public Health Committee of its Town Council, on the preventing of tuberculosis, this question is discussed as follows:

"But may the city look for an adequate return for such an addition to its annual burdens? It may be respectfully answered that upon the evidence of figures set forth in this report, there is no expenditure of public money more likely to yield an ample and immediate return. It is not unreasonable to expect that, in the way suggested, within ten years the mortality from consumption in Edinburg will be reduced by 200 per annum. But, if only 100 lives were saved to the community, it may be claimed that the expenditure would be justified. Upon the experience of last year, the average age at which we lose our people through consumption being about thirty-three, it may be reckoned that each saved life may be taken as good for ten years of labor. There is good authority for taking the annual wage-earning power of each citizen at £35, and £35 capitalized at ten years' purchase would give £350 for each saved life. If the mortality were reduced by only 100 lives, the saving per annum would then be £35,000, which must be admitted to be ample return upon an annual expenditure of £5,000. To this saving there should be added the further saving of sick-bed expenses and loss of wages of the victim."

The average annual wage earning power of our citizens would doubtless be more than £35.

As better demonstrating the proposition that such hospitals pay in dollars and cents is the fact that there are in Germany not less than six of the companies which insure workmen against sickness, that have built hospitals of their own for the cure of tuberculosis. They found they were paying out such large sums on account of sickness from this disease that they could better afford to build hospitals and send their "risks" to them at their own expense.

As showing how this problem affects insurance companies the following is quoted from a valuable paper on "Industrial Insurance and the Prevention of Tuberculosis," by Frederick L. Hoffman, Statistician of the Prudential Insurance

Company of America, which was presented to the last British Congress on Tuberculosis:

"In a few words, the annual cost of deaths from tubercular diseases to the Prudential Insurance Company of America, is approximately, on the basis of three years experience, the sum of $800,000. Over 6,000 deaths are annually due to this cause in our experience at the present time, and as far as I am able to judge from the facts before me, the company has thus far benefited little by the actual decline in the death rate from consumption which we know has taken place in recent years. I attribute this rather unexpected result to the fact that there is a very strong selection against the company, which it has thus far been impossible to overcome by our present method of medical examination, by too much reliance upon the doubtful value of the family history of the applicant and by too little reliance upon the determining method of a thorough physical diagnosis. Hence you note, and no doubt with surprise, that while on the average we have received $24.00 from those who died from consumption, we returned to the beneficiary under Industrial policies over $134.00, a net loss of about $110.00 on every case, or more than half a million dollars during the course of a year. If you examine these facts closely you will realize the great interest of the Industrial companies in the problem of diminishing the mortality from tuberculosis, especially at the early age when, as for instance at 25–29 we will have received $18.00 in premiums to every $15.00 paid out for losses. Thus I believe I have not gone too far in the earlier part of my remarks, when I have stated that the interests of Industrial companies in the prevention of tuberculosis are coincident with general interest of the population at large, since in certain portions of the United States four-fifths of the entire population are to-day insured on the Industrial plan of family insurance."

It is but fair to state that the author concluded that with even this great loss it would not pay such companies to build sanatoria of their own. A careful reading of his argument has not convinced me of the correctness of this conclusion.

Maine established last year an association similar to this society and proposes to build a hospital by private means. In support of this plan the Secretary of the Association wrote me as follows:

"The movement has been very cordially supported by the general public, and we have already, I think, fully two hundred and fifty members, and we feel very sure that we shall make a success of the movement. We shall not apply to the legislature for aid. We prefer to appeal to private charity, and hope by presenting the case of the consumptive in its true light to persons who have ample means, that they will come to the rescue and enable us to erect a sanatorium and to maintain it. To those persons who have suggested asking the legislature for an appropriation to establish the sanatorium, I have said that if it is made at the first a State institution, our appeals to private benefaction in the future will be in vain. We prefer to start it on the private charity line, and see what we can do."

A middle course has been adopted by the Toronto, Ontario, Association. A bill was recently passed by the Ontario Legislature at the instance of that Association, providing that the Lieutenant-Governor in council may grant to the trustees of a sanatorium a fifth of the cost of building and land up to $4,000, and a further grant of $1.50 per week for each patient treated therein, the municipality to pay a like sum.

Our society must determine, if the hospital movement is adopted, as I hope it will be, whether it will ask State aid, or seek by private means to build and control a hospital of its own. Personally I am inclined to favor the latter method, and I have faith in the generosity of our people, and that when the possibility for good of such institutions is fully realized, and it is known that such a society as this is ready to guarantee the proper expenditure of funds placed at its disposal, there will not be lacking a sufficient number of persons who will come forward with means sufficient to the end.

If it should be decided to ask Legislature for a hospital, or for State co-operation, as in Ontario, I would suggest that it would scarcely be wise to do so at once. At most the present Legislature might be requested to appoint a commission to investigate and report to the next General Assembly upon the feasibility of establishing in Ohio hospitals for the cure of tuberculosis, and the benefits reasonably to be expected from such institutions.

There are many benefit organizations among workingmen, secret societies, etc., that are annually expending large sums on account of tuberculosis, and with no other returns in most cases except the prolongation of life for a few months. It does not seem doubtful that they would be greatly interested in the establishment of hospitals where their more hopeful cases, and for probably a less sum, might be cured.

Here, then, as I view it, is a great work in which this society may engage, and there is every reason to hope, with success. Let us collect and disseminate in appropriate form, information concerning the benefits of such hospitals, their cost and plan of construction; the manner of their operation, in a word, let us tell the people what they are and the good that they may do. Let us individually and collectively bring such facts to the notice of those of our people who are blessed with big hearts and big purses, and we may finally see grow into shape tangible evidences of what to-day is but a purpose of this society — the establishment of hospitals where the unfortunate victims of this disease may be given at least equal chances in the fight for life.

In conclusion I would urge that means be sought for to interest and utilize every member of the society. There is work for all, and the great need is to give it useful, practical direction. It may be considered wise to distribute the work among a number of committees. There is State and Municipal legislation, a large field capable of subdivision. There might be a press committee, a committee to gather information, a lecture bureau committee, an auxiliary society committee, a committee to solicit aid, (donations), a committee to prepare printed matter for distribution. Other phases of the work will doubtless present themselves which could be, possibly, best handled by special committees. While most of our members will be busy men and women, it is this class only who inaugurate and push forward movements of this character. Let the way be pointed out, and willing hands will be found to carry on the battle.

THE SANITARY CONDITION OF SCHOOL BUILDINGS.

A report was requested from the boards of health of all cities and villages, upon the sanitary condition of school buildings within their jurisdiction. Section 2135 of the Revised Statutes of Ohio provides that the board of health "is hereby required to inspect semi-annually, and oftener if in the judgment of the board it shall be deemed necessary, the sanitary condition of all school buildings within its jurisdiction." Certain questions covering the main points in school hygiene as regards the school buildings, were propounded, and appropriate blanks furnished for replies. The results of the inquiry are given on another page.

The various other operations of the Board during the year that it seems advisable to publish, the annual reports of local boards of health, the statistics of mortality, etc., will be found under appropriate headings.

SECRETARY'S REPORT AND MINUTES OF BOARD MEETINGS.

JANUARY MEETING.

A regular meeting of the State Board of Health was held at the office of the Secretary, Columbus, January 16th, 1901.

All the members of the Board were present, Dr. Gemmill presiding.

The Secretary read the minutes of the October meeting which, on motion of Dr. Chapman, were approved.

A delegation from Findlay, consisting of A. G. Fuller, Esq., Dr. J. P. Baker and Mr. John W. Grimm, members of the board of health, and Mr. Amos Beardsley, Health Officer, presented plans for an extension of the sewerage system of Findlay and asked that they be approved.

The matter was referred to executive session.

The Secretary reported that upon the request of the Board of Sewer Commissioners of Kent, Ohio, the Engineer had made an examination of conditions there to determine whether it would be permissible to allow the village to construct sewers and discharge the sewage into the Cuyahoga River. The report of the engineer was read by the Secretary.

The matter was referred to executive session.

The Secretary presented a report upon a proposed addition to the public water supply of Coshocton.

On motion of Dr. Stanton it was voted to approve this proposed addition to the water supply of Coshocton.

Those voting in the affirmative being Messrs. Stanton, Crossland, Miller, Warner, Chapman, Hartzell and Gemmill.

In the negative, none.

All the members of the Columbus Sewer Commission and the City Engineer of Columbus being present, it was voted to take up the report of the committee to which was referred plans for disposing of the sewage of Columbus, previously filed with the Board by said commission.

The report was read by the Secretary.

On motion of Dr. Chapman, and seconded by Mr. Hartzell, the Board voted to adopt the report of the committee and its recommendations disapproving the proposed plans for disposing of the sewage of Columbus.

Those voting in the affirmative being Messrs. Stanton, Crossland, Miller, Warner, Chapman, Hartzell and Gemmill.

In the negative, none.

The Secretary presented his quarterly report, which was approved and ordered filed for publication.

A communication was presented from the Lakeside Company asking the Board to appoint Mr. Wm. Carroll as health officer for Lakeside.

On motion, the Secretary was instructed to confer with the local board of health of Lakeside as to the suitability of the proposed health officer, and authorized to approve the appointment if agreed to by the local board of health.

The Secretary reported that Mr. F. M. Stevens, City Solicitor, representing the city of Elyria, had requested the Board to approve plans for a public water supply for Elyria. The Engineer was sent to Elyria to make an investigation and the fact developed that no changes were contemplated in plans already approved by the Board.

Mr. Stevens requested, however, that the Board reaffirm its action in the matter.

On motion of Dr. Warner it was voted to be the sense of the Board that no further action was required in the Elyria case.

A communication was presented from Major Frederick Von Schrader, Acting Depot Quartermaster U. S. Army, New York, requesting the Board's permission to bring into or transport across the state, the bodies of soldiers and other persons who died in the West Indies of yellow fever or other disease, after the cold weather sets in.

On motion of Dr. Warner it was voted to grant the request.

Dr. Warner presented a committee report of an investigation he had made assisted by the Engineer, of the outlet for a sewerage system for the village of Greenfield; and recommended that the outlet be approved under certain conditions named in the report.

On motion of Mr. Hartzell, and seconded by Dr. Chapman, it was voted to adopt the report and approve the recommendations contained therein.

Those voting in the affirmative were Messrs. Stanton, Crossland, Miller, Warner, Chapman, Hartzell and Gemmill.

In the negative, none.

The Secretary reported that at the October meeting of the Board, for lack of time the minutes of the May meeting were not read. It was voted to have the minutes read at this time. The minutes were read and on motion of Dr. Warner, approved.

Dr. Chapman, as a committee, reported verbally on a proposed sewer for District No. 36 of the city of Toledo, and asked for further time.

On motion of Dr. Miller it was voted to continue the committee and grant time for further report.

The question of plans for sewerage for Findlay was taken up for discussion.

On motion of Dr. Chapman, and seconded by Dr. Miller, it was voted to approve the plans submitted upon the condition that the sewage should be purified in a satisfactory manner whenever this should become necessary, as determined by the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Gemmill, Crossland, Chapman, Warner, Miller and Hartzell.

In the negative, none.

The question of permitting the village of Kent to construct sewers to discharge crude sewage into the Cuyahoga River was discussed.

On motion of Dr. Miller, and seconded by Dr. Chapman, it was voted that such permission be granted provided that plans be filed in the office of the Board showing the location of sewers, the outlet of the sewerage system, and furthermore, that the sewage should be purified in a satisfactory manner whenever this should become necessary, as determined by the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Crossland, Miller, Warner, Chapman, Hartzell and Gemmill.

In the negative, none.

Messrs. Wagoner and Woodward appeared before the Board and stated that the city of Sidney had created a sewer commission and was proposing to construct a sewerage system. The commission wished the Board to determine whether it would permit them to discharge unpurified sewage into the Miami River.

Dr. Warner made a statement as to the condition at Sidney, having, as a committee, investigated the river and the location of the proposed outlet.

On motion of Dr. Warner, and seconded by Dr. Stanton, it was voted to approve the construction of a sewerage system for the city of Sidney, with a discharge of crude sewage into the Miami River, subject to the condition that plans showing the exact location of the proposed outlet sewer should be filed with the Board for approval, and that the sewage should be purified in a satisfactory manner whenever this should be deemed necessary by the State Board of Health.

Those voting in the affirmative were Messrs Stanton, Crossland, Miller, Warner, Chapman, Hartzell and Gemmill.

In the negative, none.

On motion of Dr. Stanton, and seconded by Dr. Warner, it was voted to approve plans for additional water supply for Leetonia; previously approved by mail vote.

Those voting in the affirmative were Messrs. Stanton, Crossland, Miller, Warner, Chapman, Hartzell and Gemmill.

In the negative, none.

No further business presenting the Board adjourned to meet at the call of the President.

Attest: C. O. Probst, *Secretary*.

QUARTERLY REPORT OF THE SECRETARY.

To the President and Members of the Ohio State Board of Health,

GENTLEMEN: — Your Secretary begs leave to offer the following report:

A large part of my time has been taken up with smallpox. For the year ended December 31, 1900, there were reported to the Board 2,696 cases and 24 deaths. For the year ended December 31, 1899, 1,756 cases and 32 deaths were reported. From April 6th, 1898, when the present epidemic may be said to have begun, to January 1, 1899, there were 669 cases and 5 deaths. Four hundred and fifty-nine cases and 3 deaths have been reported from January 1st to January 15th, 1901, but 286 of these were in Cleveland. This gives a total of 5,580 cases and 64 deaths reported from the beginning of the epidemic to January 15, 1901.

I have had a spot map prepared to show the present location of smallpox. Reports are not always made of the dismissal of qarantine. It is assumed that the disease is still present in places where it was reported between December 15, 1900, and January 15, 1901. There were 646 cases reported during that time.

There have undoubtedly been many cases that were not reported, no physician having been called.

It will be noted that the death rate from smallpox for 1900 was less than one per cent.

Investigations of smallpox or suspected smallpox have been made as follows:

October 18, Green Township, Miami County, by Dr. Moninger.
November 3, Kenton, Dr. Chapman.
November 5, Gallipolis, Dr. Probst.
November 11, Otway, Scioto County, Dr. Lyle.
November 15, Payne, Paulding County, Dr. Laudick.
November 20, North Royalton, Cuyahoga County, Dr. Probst.
November 24, Van Wert and Paulding Counties, Dr. Laudick.
November 30, Jackson and Wellston, Dr. Probst.
December 2, Ashtabula, Dr. Hoover.
December 4, Payne, Dr. Chapman.
December 4, Edon, Williams County, Dr. Collamore.
December 15, Otway, Scioto County, Dr. Lyle.
December 16, West Salem, Wayne County, Dr. Moninger.
December 17, Beaver Dam, Allen County, Dr. Laudick.
December 23, Bedford, Cuyahoga County, Dr. Hoover.
December 23, Cecil, Paulding County, Dr. Chapman.
December 27, Gates Mills, Cuyahoga County, Dr. Probst.
December 27, Radnor, Delaware County, Dr. Moninger.
December 30, Near Bedford, Dr. Hoover.

January 5, Greenfield Township, Gallia County, Dr. Johnston.

January 7, Springfield Township, Gallia County, Dr. Johnston.

January 9, Stryker, Williams County, Dr. Chapman.

January 11, Gates Mills, Cuyahoga County, Burton and Chesterland, Geauga County, Dr. Moninger.

January 12, Toledo State Hospital, Dr. Chapman.

January 14, Ironton, Dr. Lyle.

This makes twenty-five localities that have been visited by the Board on account of smallpox.

I have asked Dr. James Johnston, of Gallipolis, to act as a medical inspector. Dr. Johnston has been health officer of Gallipolis for many years, and has had a very considerable experience with smallpox.

In a number of cases I have been able to advise local authorities by telegraph and telephone, avoiding the necessity of a personal visit. There have been so many calls by telegram, telephone and letter for advice in reference to smallpox, that I have felt it best to remain as closely at the office as possible.

During the quarter ending January 15, 1901, 334 letters and telegrams relating to smallpox have been received. A much larger number of letters had to be written in reply thereto.

There is little likelihood, in my judgment, of the epidemic abating. There is still a large unvaccinated element in Ohio, and there is every reason to fear that the disease will run for several years yet.

In addition to investigations of smallpox the following places have been visited by committees or representatives of the Board:

October 27th, the Engineer visited Leetonia relative to a new water supply.

November 12th, the Secretary visited Highland, Highland County, to determine the character of an outbreak of throat trouble. It proved to be diphtheria, and proper steps were taken to control the disease.

November 15th, the Secretary visited Bond Hill to investigate a nuisance arising from turning sewage from Cincinnati and Norwood into Duck Creek, which flows through Bond Hill. The attention of the authorities of Cincinnati and Norwood was called to the nuisance.

December 3rd, the Engineer visited London and investigated a nuisance caused by sending sewage to an open ditch. He reported that the installation of a general sewer system is probably the only way to abate the nuisance. The board of health of London, which had requested the investigation, was duly notified of the findings.

December 6th, Dr. Warner and the Engineer went to Greenfield to examine plans for a new sewerage system. Their report was submitted to the Board, by mail, but no action has been taken on it.

December 19th, the Engineer and Bacteriologist visited Cuyahoga Falls and examined wells proposed for a new water supply. This supply was previously approved by the Board, but as the purity of the supply was seriously questioned by many citizens and one of the newspapers of Cuyahoga-Falls, it was deemed best, at the request of the Consulting Engineer, Mr. L. E. Chapin, to make a second examination. The results of the former examination were confirmed.

The Sewer Commission of Kent made application for approval of the Board, to discharge sewage into the Cuyahoga River. The Engineer visited Kent on January 10th, and his report is ready for submission at the pleasure of the Board.

All the arrangements have been made for the joint meeting of boards of health for January 17th and 18th.

Respectfully submitted,

C. O. PROBST, *Secretary.*

APRIL MEETING.

A regular meeting of the State Board of Health was held at the Grand Hotel, Cincinnati, Ohio, April 10th and 11th, 1901.

There were present Drs. Stanton, Gemmill, Chapman, Miller, Warner and Mr. Hartzell.

Dr. Gemmill presided.

The first session was begun at 8 p. m. of the 10th.

Mr. H. E. Riggs, C. E., presented plans for a sewerage system for the following places, viz: Sidney, Jackson and Maumee.

It was voted to consider these plans in executive session.

Mr. Kellogg, a representative of the First Ward in the city of Cincinnati, informally presented the question of the construction of a sewer to be used temporarily for surface drainage in that part of the city.

An invitation from Mr. C. E. Schaff, General Manager of the C. C. C. & St. L. Railway Company, was presented to the Board by the Secretary, to inspect a new train of this company, embodying, it was claimed, some improvements in sanitary construction.

It was voted to accept the invitation.

Dr. N. P. Dandridge, of Cincinnati, invited the Board to inspect a new pathological laboratory at the city hospital.

The invitation was accepted with thanks.

The Board then went into executive session.

The plans for a sewerage system for Sidney were taken up.

It was moved by Dr. Warner, and seconded by Mr. Hartzell, that said plans be approved subject to the conditions already established by the Board, viz: that the sewage shall be purified in a satisfactory manner whenever this shall become necessary, as determined by the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Gemmill, Chapman, Miller, Warner, and Hartzell. In the negative, none.

On motion of Dr. Miller, and seconded by Dr. Stanton, it was voted to approve the plans for a sewerage system for Jackson, provided that sewage purification works, to be satisfactory to the Board, be installed prior to the use of the sewers.

Those voting in the affirmative were Messrs. Stanton, Gemmill, Chapman, Miller, Warner and Hartzell. In the negative, none.

On motion of Dr. Miller, and seconded by Dr. Chapman, it was voted to disapprove the plans proposed for a sewerage system for the village of Maumee.

Those voting in the affirmative were Messrs. Stanton, Gemmill, Chapman, Miller, Warner and Hartzell. In the negative, none.

On motion of Dr. Warner, it was voted to appoint Dr. Chapman a committee to investigate the pollution of the Maumee River from the village of Maumee to the intake of the water works of the city of Toledo.

The Secretary presented a map showing the location of an outlet sewer for a system of sewers for the city of Circleville, and stated that said map had been furnished by the City Engineer of Circleville with the request that the plans with outlet be approved. The plans showed this outlet sewer to discharge into a large pool which receives the waste flow from the strawboard works at that point, said pool overflowing to the Scioto River.

The Board was not in favor of permitting sewage to be discharged into this pool and the Secretary was instructed to refer the plans back to the City Engineer of Circleville, and ask for other plans with a new and definite outlet.

Dr. Chapman reported upon a proposed sewer for District No. 36 of the city of Toledo.

On motion of Dr. Stanton, and seconded by Dr. Gemmill, it was voted to disapprove said plans until satisfactory plans for the purification of the sewage of this district were submitted to and approved by the Board.

Those voting in the affirmative were Messrs. Stanton, Gemmill, Chapman, Miller, Warner and Hartzell. In the negative, none.

The minutes of the January meeting were read and approved.

The Secretary presented a communication from Mrs. M. B. Briggs, member of the visiting committee for the county infirmary, of Chillicothe, in reference to the bad condition of the sewerage of the county infirmary and the children's home of Ross County.

On motion of Dr. Chapman it was voted to appoint a committee to investigate and report upon the condition of these institutions, and the President appointed Dr. Warner as a committee of one for this purpose.

The Secretary presented a report on the subject of tuberculosis, and recommended the organization of a State Association for the Prevention of Tuberculosis.

On motion of Dr. Chapman it was voted to appoint a committee to investigate and report at the next meeting on the feasibility of carrying out the suggestions embodied in the report of the Secretary.

The Chair appointed Messrs. Probst, Warner and Stanton as this committee.

It was then voted to recess until 9 a. m. of the following day.

SECOND SESSION.

9 A. M. Thursday, April 11th, 1901.

The members were present as before.

The Secretary presented a communication from Messrs. Darlington and Sabin, attorneys, of Xenia, Ohio, in which they asked the Board to reconsider the approval of the location of sewage disposal works for the city of Xenia. It was claimed that their client, Miss Emma B. Cromwell, whose house is located near the proposed purification works, would be damaged thereby.

Mr. G. A. McKay, City Engineer of Xenia, being present, was asked to make a statement as to the situation there.

Mr. McKay stated that the distance from the filter beds to the complainant's house was 268 feet instead of 168 feet, as claimed, and that the city of Xenia was prepared to make suitable settlement with the complainant should the purification works prove to be a nuisance.

On motion of Mr. Hartzell it was voted to be the sense of the Board that this matter required no further action on the part of the Board at the present time.

The Secretary presented a request from the council of Geneva, signed by five members thereof, asking the Board to approve the public water supply to be obtained by impounding the waters of Cowles Creek. The request was accompanied by a communication from the Engineer of Geneva as to the extent of the watershed of Cowles Creek and the number of inhabitants and animals upon the watershed.

A report of the Engineer of the Board, Mr. Flynn, was read, showing the rainfall upon said watershed and the amount of water that could be stored.

Letters were read from Mr. F. B. Wetmore, a member of the council of Geneva, opposing the approval of this supply.

On motion of Dr. Miller it was voted to refer this question to a committee, which had already been appointed to consider the matter of a water supply for Geneva, namely to Dr. Chapman.

The committee appointed to prepare changes in laws governing State and local boards of health submitted a report. Certain changes were recommended and accepted, and the committee was continued with the understanding that the report would be submitted to some of the representative health officers of the State, and be again brought before the Board for consideration at its June meeting.

There being no further business the Board adjourned to meet in Cleveland on the fourth Wednesday of June.

Attest: C. O. PROBST, *Secretary.*

QUARTERLY REPORT OF THE SECRETARY.

To the President and Members of the Ohio State Board of Health,

GENTLEMEN: — Your Secretary begs leave to present the following report:

Smallpox has continued to prevail in many parts of the State. The Ohio Sanitary Bulletin gives the number and location of cases reported during January, February and March. The total number for the quarter was 1,360 cases and 19 deaths. During that time the disease was reported in forty-nine counties of the State.

Great difficulty was experienced in securing the enforcement of proper measures in smallpox cases in Williams County. Dr. Collamore was sent there early in December and pronounced the disease smallpox. Some of the physicians and many of the people refused to believe the disease to be smallpox. The board of health of Northwest Township, where most of the cases occurred, requested another investigation. Accordingly Dr. Chapman visited the county, made a thorough investigation of the cases, and pronounced the disease smallpox. Apparently, the diagnosis has been accepted, as no further complaints have been received. Four cases have been reported in the county, at Edon, since Dr. Chapman's visit on March 7th.

A serious outbreak of smallpox was reported by Dr. Wright, of New Lexington, Perry County, in Pike and Harrison Townships. An inspector was sent there March 27th. He found that smallpox had been prevailing, unrecognized, since early in January. There had been nine cases in Pike Township and twenty-one in Harrison. There are large coal mines, employing several hundred men, in these townships, and the exposure to smallpox had been quite general. The local health authorities took hold of the matter vigorously. There was at first a little friction with the C. & M. V. Railway on account of some needlessly stringent orders of the local board, but this was soon adjusted. The railway company disinfected its stations and waiting-rooms, ordered vaccination of their employes, and everything has moved smoothly since. Six additional cases in Harrison Township, and no new cases in Pike Township, have been reported since our inspection.

Another recent outbreak of smallpox, at Franklin, a mining town in Belmont County, was investigated April 5th. Fifteen cases were found in Richland Township; some of the patients having already recovered.

The following inspections of smallpox have been made since the last meeting:

January 20th, Dr. Moninger visited Shelby and Crestline.

January 22nd, Dr. Collamore visited Melrose, Paulding County.

January 22nd, Dr. Johnston visited Thurman, Gallia County.

January 26th, Dr. Moninger visited Savannah, Ashland County.

January 27th, Dr. Laudick visited Marion, Marion County.

January 27th, Dr. Moninger visited Ashland and Richland Counties.

January 31st, Dr. Moninger visited Chicago Junction, Greenwich and Fitchville, Huron County.

January 31st, Dr. Collamore visited Melrose, Paulding County.

February 7th, the Secretary visited Fitchville.

February 11th, the Secretary visited Logan.

February 26th, Dr. Moninger visited Newark.

March 7th, Dr. Chapman visited Williams County.

March 14th, Dr. Moninger visited Coshocton.

March 23rd, Dr. Moninger visited Franklin and Pleasant Townships, Franklin County.

March 27th, Dr. Moninger visited Crooksville, Perry County.

April 4th, Dr. Moninger visited Dayton.

April 5th, Dr. Heinlein visited Belmont County.

April 5th, the Secretary visited Springfield.

Smallpox was found except at Melrose and Newark. At the former place the disease was measles, and at the latter place chickenpox.

Dr. Johnston, of Gallipolis, who was acting as medical inspector, died, and Dr. Fred A. Cromley, an experienced, competent physician, who has had a very considerable experience with smallpox, was appointed in his stead.

In all instances where smallpox is reported the local authorities are communicated with, and proper instructions given. In communities where the diagnosis of smallpox has not been generally accepted, and especially where one or more physicians have refused to recognize the disease as smallpox, there has been considerable difficulty in getting the local authorities to enforce sufficiently vigorous measures. Especially is this true of the township authorities. In several instances I have thought it would be advisable for the Board to appoint some one to take control of the outbreak, and to remain upon the ground to insure the carrying out of proper measures. The funds of the Board do not admit of this being done, and it would necessitate an appeal to the Emergency Board to authorize a deficiency. I am inclined to think this would not be advisable, at least for the present, but bring the suggestion forward so that the Board may consider it, if it so wishes.

The following communication was receved in reference to conditions at Yorkville:

STEUBENVILLE, OHIO, February 4, 1901.

C. O. PROBST, *Secretary State Board of Health, Columbus, Ohio.*

DEAR SIR: — By unanimous vote of the delegates to the Jefferson County Trades and Labor Assembly, which is composed of the different labor organizations of Jefferson County and vicinity, I was instructed to write to you and see if you would not attempt to secure for the miners employed at the Cleveland and Pennsylvania Railroad mines at Yorkville, Jefferson County, a better sanitary condition, in the way of a water supply. As it is, the management has supplied only one pump for a whole row of houses, which contains 28 families. The owners of the premises on which there are pumps or wells have refused the miners the privilege of using them, which is very natural, and the river is quite a long distance away — too far to carry water. Such a condition of affairs could not help but be dangerous to health, as cleanliness would be impossible, and especially would it be dangerous in the summer months. The management has been appealed to in vain, and it is to be hoped that your honorable Board will take proper steps to better the condition of affairs.

Hoping you will give the matter prompt attention, I remain,

Yours very respectfully,

(Signed) H. P. BOYER, *Secretary.*

The Engineer visited Yorkville on the 13th of February and reported upon conditions there; and the following correspondence with the mine owners ensued:

COLUMBUS, O., February 25th, 1901.

To the Ohio and Pennsylvania Coal Company, Cleveland, Ohio.

GENTLEMEN: — The Jefferson County Trades and Labor Assembly requested this Board to investigate the sanitary condition of the Cleveland and Pennsylvania Railroad Company's mines at Yorkville, Jefferson County, with special regard to the water supply which was alleged to be unsatisfactory.

The engineer of this Board was sent to Yorkville on February 13th and has reported his findings. He states that the houses are divided into two groups. In the first group, containing eight double houses, occupied by sixteen families, they are supplied by water from one driven well located in the center of this group of houses. The second group of houses, which is some distance below the first, contains fifteen double houses occupied by thirty families. They are also supplied by one driven well located in a field back of the houses, and nearly 200 yards distant from the farthest house. The privies of this group are built over planked vaults in the rear of the houses, several being not more than 30 yards from the well. Some water is obtained from a spring, but as this is used for watering the bank mules it is considered objectionable.

A sample of the water was collected by the engineer from this latter well and has been subjected to chemical and bacteriological examination. We found in the sample 325 bacteria per cubic centimeter, but there were no disease producing bacteria found in this number. The chlorine was equal to 12.2 parts per million; nitrogen as nitrates 4.80, and nitrites .056 parts per million. While the well has apparently not been the cause of disease among its users, the examination shows that it is receiving pollution from the adjacent privies. There would be great danger if a case of typhoid fever should be introduced there and the stools of the patient thrown into one of the privies near the well, that the well would become specifically polluted and cause an outbreak of typhoid fever among its users.

Complaint is made that it is a considerable hardship for some of the families to be obliged to carry water so far. This might lead to the use of insufficient water, or to the drinking of water which had been kept in the house until it was not fit for drinking purposes.

I trust that this matter will receive the attention of your Company and that some steps will be taken either to introduce a different water supply or to put down some extra wells and make provision to protect them against pollution by adjacent privy vaults.

Yours very truly,
(Signed) C. O. Probst, *Secretary.*

They replied:

Cleveland, Ohio, March 8th, 1901.

C. O. Probst, M. D., *Secretary State Board of Health, Columbus, Ohio.*

Dear Sir: — Your letter of February 25th is at hand.

For a period of over thirty years the miners had lived at our mines with nothing but the little stream you speak of as their water supply. About ten years ago we drove down two wells in order to give the miners better water facilities, but they were so indifferent about them that their children filled them up with stone and rock until they became perfectly useless. We therefore sunk the two wells they are now using.

The Jefferson County Trades and Labor Assembly has probably been requested by one of our disgruntled miners to notify you, and they have done so without sufficient cause.

I do not see how we could better protect our people than we have done — having made available water at a depth of 110 to 118 feet through two wells that have steel casings down to the rock.

Upon the principle that you would condemn these wells, you would discontinue the use of every well in use in every village in this county, and you do it without giving us an opportunity to be with you on the ground at the time the condemnation is made.

Since we have operated this property, we have never to our knowledge had any difficulty whatever by ill health or contagious diseases of any character.

Of course we want you to feel that we are as much interested in the health of our people as anybody, and are willing to do all in our power to improve the sanitary condition of this village, but not at the suggestion of some irresponsible and perhaps discharged employe, who makes a vicious complaint through your Board, and is encouraged to the extent that we are not given an opportunity to defend ourselves on the ground.

Very respectfully yours,
Ohio & Pennsylvania Coal Company,
(Signed) J. B. Zerbe, *Prest.*

I then wrote him as follows:

Columbus, Ohio, March 14th, 1901.

Mr. J. B. Zerbe, *Pres. Ohio & Pennsylvania Coal Co., Cleveland, Ohio.*

Dear Sir: — I am in receipt of your letter of the 8th instant in reference to the sanitary condition of Yorkville.

We had no idea of condemning the sanitary condition of this village without giving a representative of your Company an opportunity to be heard in the matter. Our engineer in visiting Yorkville called upon your representative there and made known the purpose of his visit. I have reported to you the results of the investigation. As stated in my former letter, the investigation did not indicate that the wells are at this time specifically polluted or the cause of disease. It did indicate the probability of the wells becoming polluted at some future time on account of their close proximity to various sources of pollution.

I know nothing of who made complaint to the Jefferson County Trades and Labor Assembly, nor what inspired such complaint. We were simply fulfilling our duties in complying with the request of that organization for an investigation of the sanitary condition of this village. I know something of the difficulties of keeping a mining village in proper sanitary condition, and of the carelessness of the inhabitants of such villages in reference to such matters. I presume the complaint was due more to the inconvenience in obtaining drinking water than to any fear that the water might be polluted.

I would suggest that you have your own chemist make frequent examinations of the yield of these two wells. An increasing pollution would be indicated by such examinations and you might, by that means, avoid an outbreak of disease among your miners.

Yours truly,
(Signed) C. O. PROBST, *Secretary.*

He replied:

CLEVELAND, OHIO, March 16th, 1901.

C. O. PROBST, ESQ., *Sec'y. State Board of Health, Columbus, Ohio.*

DEAR SIR: — Please accept my thanks for your communication of March 14th. We will adopt your suggestion of having the wells analyzed, and in case we find any bacteria in the water we will put down new wells at a greater distance from the houses.

Very respectfully yours,
OHIO & PENNSYLVANIA COAL COMPANY,
(Signed) J. B. ZERBE, *Pres.*

I then wrote:

COLUMBUS, OHIO, March 18th, 1901.

MR. J. B. ZERBE, *Pres. Ohio & Pennsylvania Coal Company, Cleveland, Ohio.*

DEAR SIR: — I am just in receipt of your favor of the 16th, and am glad that you will adopt the suggestion, to have periodical examinations made of the water from the wells at Yorkville. You speak of examining the wells for bacteria. I would suggest also that chemical examinations be made, which will perhaps be of some value in determining increasing pollution, if any, of these wells.

Yours truly,
(Signed) C. O. PROBST, *Secretary.*

Respectfully submitted,
C. O. PROBST, *Secretary.*

JUNE MEETING.

A regular meeting of the State Board of Health was held at the Hollenden Hotel, in Cleveland, June 26th and 27th, 1901.

The Board was called to order at 8 p. m. There were present Drs. Gemmill, Stanton, Miller, Chapman, Warner, and Mr. Hartzell.

Dr. Gemmill presided.

The committee to which was referred amended plans for additional sewerage and sewage disposal works for the city of Columbus presented a report. Professor Brown and Mr. Clahane, members of the Columbus Sewerage Commission, who were present, were invited to discuss the report.

Mr. Sherman, of Toledo, of the firm of Riggs and Sherman, presented plans for a sewerage system for Upper Sandusky.

The minutes of the last previous meeting were read and approved; also the quarterly report of the Secretary.

A communication from the clerk of the city of Akron, requesting the Board to investigate the water supply of that city, was read by the Secretary.

On motion of Dr. Warner, Mr. Hartzell was appointed a committee to investigate and report on the condition of Akron's water supply.

The Secretary presented an application for approval of a public water supply for the village of Woodsfield, and a report on the proposed supply.

On motion of Mr. Hartzell, and seconded by Dr. Warner, the Board voted to approve the proposed supply upon the condition that the water company be required to take the necessary measures to protect the supply against dangerous surface pollution.

Those voting in the affirmative were: Messrs. Gemmill, Stanton, Miller, Chapman, Warner and Hartzell. In the negative, none.

The Secretary presented a communication from Dr. Harmon, of Lancaster, requesting the Board to make another examination of the public water supply of that city.

On motion of Dr. Stanton, the Secretary was instructed to have the Engineer and Chemist report upon the condition of Lancaster's water supply.

The Secretary presented a communication from the Superintendent of Water Works of Ironton, asking the Board to approve an addition to the water supply of that city, to be obtained from a well within city limits. A report upon the location and character of the well, and the results of a chemical and bacteriological examination of a sample of the water was also presented.

On motion of Dr. Chapman, and seconded by Mr. Hartzell, it was voted to disapprove this additional source of supply.

Those voting in the affirmative were Messrs. Gemmill, Stanton, Miller, Chapman, Warner and Hartzell. In the negative, none.

On motion of Dr. Stanton, and seconded by Mr. Hartzell, it was voted to approve the report and recommendations of the committee on plans for proposed sewerage and sewage disposal for the city of Columbus.

Those voting in the affirmative were Messrs. Gemmill, Stanton, Miller, Chapman, Warner, and Hartzell. In the negative, none.

On motion of Dr. Warner, Dr. Gemmill was appointed a committee to investigate and report upon plans for sewerage for Upper Sandusky.

The election of officers was taken up. Dr. Warner nominated for President Dr. Byron Stanton, and moved that the Secretary be instructed to cast the ballot of the Board for Dr. Stanton as President. The motion was carried, and the Secretary reported that he had cast the ballot as instructed. Dr. Stanton was declared elected, to take his seat in October.

Dr. Warner moved that the Secretary be instructed to cast the ballot of the Board for Dr. J. C. Crossland as Vice- President. The motion was carried, and the Secretary reported having cast the ballot, and Dr. Crossland was declared elected, to take his seat with the President.

Dr. Warner moved that the President-elect be appointed a delegate to the next meeting of the American Public Health Association. The motion was carried.

On motion of Dr. Stanton, the Secretary was appointed a delegate to the same meeting.

Dr. Stanton moved that the President be appointed as delegate to the next meeting of the Conference of State and Provincial Boards of Health. The motion was carried.

Adjourned to 9 a. m. of the following day.

SECOND SESSION.

Thursday, June 27th, 1901.

The Board reassembled pursuant to adjournment. Present as before, except Dr. Warner.

The Secretary presented plans for new sewers for districts 13 and 14 for the city of Cincinnati, and a commmunication from the Clerk of the Board of Public Service of said city, asking that these plans be approved.

On motion of Dr. Chapman, the matter was referred to Dr. Stanton for investigation and report.

The Secretary presented plans showing the location and construction of a garbage disposal works proposed for the city of Hamilton, and a communication from the President of the Board of Control of said city, requesting that the location and plans for such garbage disposal works be approved.

On motion of Dr. Chapman, and seconded by Dr. Miller, it was voted to approve the plans proposed for garbage disposal works for Hamilton.

Those voting in the affirmative were Messrs. Gemmill, Stanton, Miller Chapman and Hartzell. In the negative, none.

On motion of Dr. Chapman, the Secretary was authorized to employ an assistant chemist.

The Secretary presented telegrams received during the meeting in reference to smallpox at Avondale.

On motion of Dr. Stanton, the Secretary was instructed to go to Avondale, if found necessary, with full powers to enforce such quarantine or other measures for the prevention of smallpox as he might deem necessary.

The committee in charge of a revision of the health laws reported that a conference with representatives of local boards of health had been held in Columbus on June 10th, 1901. The report of the committee, with amendments suggested at this conference and accepted by the committee, was presented to the Board.

On motion of Dr. Miller, it was voted to include tuberculosis in the list of diseases that local boards of health may require to be reported.

On motion of Dr. Miller, the report of the committee was approved.

Dr. Chapman moved that the action of the Board in disposing of plans for sewerage for Upper Sandusky be reconsidered.

The motion was carried.

Dr. Chapman moved that the motion to refer the plans to a committee to investigate and report be amended so as to provide that the plans presented for a sewerage system for Upper Sandusky be approved, provided said committee, after investigation, recommend their approval. Seconded by Mr. Hartzell. The motion to amend was adopted.

The original motion, as amended, was then adopted, those voting in the affirmative being Messrs. Gemmill, Stanton, Miller, Chapman, and Hartzell. In the negative, none.

The committee on a society for the prevention of tuberculosis presented a report and form of a circular letter soliciting members.

On motion of Dr. Chapman, the report was accepted and the Secretary instructed to have the letter printed for distribution.

There being no further business, the Board adjourned to meet at the call of the President.

Attest: C. O. Probst, *Secretary.*

QUARTERLY REPORT OF THE SECRETARY.

To the President and Members of the Ohio State Board of Health,

Gentlemen: — Your Secretary begs leave to present the following report, which is for the time intervening since the last meeting, April 11, 1901.

The smallpox situation has continued to demand a large share of my time and of the office force. From January 1, 1901, a five months' period, 2,907 cases and 32 deaths were reported, an average of 581 cases per month. During April and June 1,547 cases and 13 deaths were reported, an average of 773 cases per month.

The brunt of the epidemic during this five months' period was felt in the following counties: Belmont, 44 cases; Cuyahoga, 1,233, of which number 1,073 were in Cleveland; Gallia, 61 cases; Geauga, 28; Hardin, 166; Huron, 44; Lawrence, 80; Lorain, 85; Paulding, 55; Perry, 57; Richland, 67; Scioto, 168; Washington, 57; Williams, 91, and Wood 119 cases. The total number of cases reported from June 1st to June 25th was 232, making a grand total of 3,139 cases and 33 deaths from January 1st to June 25th, 1901.

The following places were visited on account of smallpox: Jerry City, Pemberville, Luckey, Portage, Williston, Scotch Ridge, Florida and Oak Harbor, by Dr. Chapman; Dunkirk, by Dr. Gemmill; Otway, by Dr. Stanton; North Baltimore, Kenton (McDonald Township) Cleveland, Painesville, by the Secretary; Rendville, Findlay, Sidney, by Dr. Moninger; Bannock P. O., Belmont County, by Dr. Heinlein; Florida and New Washington, by Dr. Collamore; Jackson Centre, by Dr. Laudick, and Harrison Township, Gallia County, by Dr. Cromley. All but two of the ten visits made by the medical inspectors were at the expense of the local authorities.

The smallpox situation in Cleveland required special attention. As previously noted, 1,073 cases were reported there from January to June. Four hundred and ninety-two of these occurred during April and May. The disease was carried from Cleveland to other places in Ohio and other states. The situation reached a crisis when the following letter from the health commmissioner of Buffalo was received:

BUFFALO, N. Y., May 17, 1901.

DR. C. O. PROBST, *Secretary State Board of Health, Columbus, Ohio.*

MY DEAR DOCTOR: — The presence, continuous amount, and epidemic character of smallpox in the city of Cleveland has been a matter of much serious concern to this municipality, particularly in view of the menace it presents to the success of the Exposition now open, as well as to the general welfare.

Other cities on the lake shore have felt much the same way, and as a result of which their health officials have secretly visited the city of Cleveland and familiarized themselves with the conditions existing there.

I, myself, made a similar investigation, openly, however, and called upon the leading officials, learned that our apprehension is well founded and that a state of affairs exists which should not, and the disease has a firm footing; that action directed against it has been loose and careless to a degree almost beyond belief; that quarantine has been meagre and insufficient, while prevention and protection by vaccination has not been enforced generally, and not at all among the schools as it should.

I met the health officer, director of police, and some other officials, and did not hesitate to criticise matters censorously and express my opinion.

A number of the leading physicians, whom I also met, are pronounced in their condemnation and agree with my opinion that the conditions present are the result of carelessness, inefficiency or ignorance, and that something should be done without delay to relieve Cleveland of the odium she is under, and other cities from the danger she presents to them.

The object of the visit of the various health officials and of myself was to learn the degree of the epidemic, what was being done, to how large an extent we are in jeopardy, what action should be taken, and, particularly, the advisability of establishing a quarantine against it. This latter action is now under advisement.

I send this communication for your information and guidance, and I think it most important that you go there at once, take hold of things with a firm hand, and straighten them out. Something must be done. Nothing has been done that has accomplished anything save to permit a development of over forty (40) cases a week, week in and week out, a condition that is as intolerable as it is a reflection.

Unless immediate action is taken and results shown, quarantine will be instituted as stated, and in the most rigorous manner, all of which is to be regretted, the more so, as it is avoidable.

The odium for Cleveland to be placed in such position; the commercial loss, immediate and remote; the inconvenience, personal and general; the sentiment of other communities, should be an incentive for action, swift and thorough.

I shall await a reply from you with much concern, to know what is contemplated or being done.

Yours cordially,
ERNEST WENDE,
Health Commissioner.

On receipt of this letter I at once communicated with the President of the Board, and advised a conference between a committee of the Board and the proper authorities of Cleveland. The President favoring this measure, a conference was arranged for in Cleveland on May 20th. There were present, on the part of the Board the President, Secretary and Drs. Miller and Chapman; and on the part of the city, the Mayor, Health Officer, President of the Council, and Dr. Corlett. The representative of the Marine Hospital Service was also present.

After a statement of the object of the conference, the following measures for dealing with the smallpox epidemic, which had been previously adopted by the committee, were read:

MEASURES FOR THE PREVENTION OF SMALLPOX WHEN EPIDEMIC IN A LARGE CITY.

Recommended by a Committee of the State Board of Health.

1. There should be sufficient hospital accommodations for the isolation and treatment of all cases that cannot be sufficiently well isolated in their homes. (Take every case possible to hospital).

(a). The hospital should be accessible.

(b). In warm weather tents, floored and warmed, would answer the purpose well.

(c). The hospital must be properly guarded at all times.

(d). Guards and nurses must be vaccinated, even if they have previously had smallpox.

(e). There should be a disinfecting station at the hospital, with provisions for disinfecting the ambulance bringing cases to it.

(f). There should be a place to dress for those leaving (discharged from) the hospital.

2. If possible a separate room or tent should be provided for doubtful cases (suspects), and a hospital or place to isolate those exposed and liable to have smallpox who cannot be, or should not be, isolated at home.

3. Persons exposed to smallpox in the eruptive stage of the disease should be treated as follows:

(a). If they have previously had smallpox, or furnish satisfactory proof of having been successfully vaccinated within two years prior to said exposure, they may be disinfected (person and clothing worn at time of such exposure) and discharged.

(b). If found and vaccinated (two places, with two different tubes or points) within seventy-two hours after first possible exposure, they may be disinfected (person and clothing) and discharged, provided that this shall only apply to responsible residents of the city, who can be punished for violating the rules of the board of health, and provided further, that all such discharged persons shall from the ninth day from the first exposure to the seventeenth day from the last possible exposure, be examined daily by a medical officer, and shall be at once isolated (quarantined) on the apperance of fever or eruption.

4. Persons associated with exposed persons need not be quarantined.

5. There should be a disinfecting corps, properly instructed and equipped, to disinfect houses after death, recovery or removal of smallpox patients.

6. Sanitary policemen for guards or other duty should be at the health office night and day. Medical inspectors should be on call to at once examine reported, suspected cases.

7. Infected districts of the city should be defined, if possible, and a medical officer and a uniformed policeman sent to inspect each house (each room and outbuilding) for concealed cases.

8. Physicians should be required to report all cases of chickenpox, giving name, age, and location. A medical officer should examine, with the attending physician, all such cases in adults.

9. Vaccination —

(a). The city should appoint public vaccinators in each ward and offer vaccination free to all. The city to furnish the virus.

(b). Medical inspectors should be appointed to inspect all school children (lady physicians for older girls) to determine their vaccinal status.

(c). All children not protected by vaccination should be prevented from attending school.

(d). All railroad men on trains coming to the city should be vaccinated (this should be ordered by the State Board of Health). Postmen and street car employes should be vaccinated, by the advice of the local board of health.

(e). A letter should be sent by the local board to the management of all workshops and factories urging that vaccination be made a condition of employment. Their attention should be called to the possible necessity of shutting down the works if smallpox should break out among their employes.

(f). Vaccination should be enforced, as far as possible, in "infected districts," at the time of the house to house inspection.

10. The importance of frequent disinfection and cleansing of street cars should be brought to the attention of the street car companies.

It was agreed that these should be put in force, and the Mayor and President of the Council promised that any sum necessary to carry them out would be provided. They also requested that the Secretary should spend as much time as possible in Cleveland until the epidemic could be gotten well in hand.

Dr. Miller and I have had a number of conferences with the health officer since that time. All the measures recommended have been or are being carried out to the fullest extent possible.

For the week ending May 25th, there were 39 cases reported; the week ending June 1st, 31 cases; June 8th, 32 cases; June 15th, 12 cases, and June 22, 26 cases.

There is no indication that the epidemic of smallpox in Ohio is nearing the end, and we shall probably have to continue an extremely difficult, and at times very discouraging, fight against the disease.

Outside of smallpox, Dr. Chapman visited Jerry City to advise the local authorities in regard to measures to suppress an outbreak of scarlet fever. Dr. Stanton and the Secretary visited Hyde Park in reference to additional sewerage for the village. This village, without the approval of the Board, had commenced a sewer which would give outlet to considerable more sewage than is flowing at present, and carry it onto private property just outside of village limits. From here it would reach Crawfish Creek, which enters the Ohio River a short distance above the present intake of the city water works. Suit had been brought by the owner of the property referred to, to enjoin the building of this sewer, on the ground that it would create a public nuisance, injure the said property, pollute the water supply of Cincinnati, and that the sewer had not been approved by the State Board of Health. Dr. Stanton and I inspected this sewer and the proposed outlet, and on the following day gave testimony before the court in favor of granting the injunction. I understand the injunction was granted.

The Engineer visited Woodsfield to investigate the source of a proposed public water supply for that village. A request for the approval of the supply is to be presented at this meeting.

The investigation of the public water supplies obtained from the Ohio River and Lake Erie has been started.

A communication was first sent to the board of health of each place where examinations are to be made, explaining the nature of the proposed investigation and soliciting their aid. The Chemist has visited each place and has examined one set of samples. Hereafter samples will be collected and sent to the laboratory by the local authorities.

The local authorities of the Ohio River towns where examinations are being made have agreed to make daily observations of turbidities, after the Hazen method, and send us a proper record. We are furnishing them with the turbidity sticks needed. In addition I have instructed the Chemist to make further laboratory examinations for turbidities to determine the character and fineness of the suspended matters, and the amounts removable by 12, 24, 48 and 72 hours sedimentation. This information will be of considerable value when the question of filtering these Ohio River supplies comes up, as it is bound to do in the near future.

The plan has not been fully developed for studying the amount and character of suspended matter in Lake Erie water supplies, but will be soon, if possible.

Following is a list of cities and villages whose water supply is being examined:

On the Ohio River, Steubenville, Toronto, East Liverpool, Bellaire, Wellsville, Mingo Junction, Martins Ferry and Bridgeport, Marietta, Pomeroy and Middleport, Gallipolis, Ironton, Portsmouth, and New Richmond.

On Lake Erie, Port Clinton, Painesville, Ashtabula and Conneaut.

It will be noted that Cincinnati, on the Ohio, and Sandusky, Lorain and Cleveland, on the lake, are omitted from the list. Cincinnati and Cleveland are putting in new supplies, and a study has already been made of the water supply of Sandusky and Lorain.

Respectfully submitted,
C. O. PROBST, *Secretary.*

AUGUST SPECIAL MEETING.

A special meeting of the State Board of Health was held at the Boody House, in Toledo, August 21, 1901.

The Board was called to order at 8 o'clock p. m.

All the members were present except Dr. Miller.

Dr. Gemmill presided.

It was voted to postpone the reading of the minutes of the previous meeting.

Mr. L. E. Chapin, Consulting Engineer, presented plans for new water supplies for the city of Wellsville and the village of Mantua.

The Secretary reported upon the sources of the proposed supplies and submitted reports by the Engineer and Chemist relative to the quality and probable quantity of water obtainable.

It was voted to consider their approval in executive session.

Mr. Chapin also presented plans for a system of sewerage with sewage purification works for the village of Ashland. These were referred to executive session.

The City Engineer of Toledo presented a plan for a sewer for Walbridge Park, to be discharged into Swan Creek. This was referred to executive session.

The Superintendent of Water Works, and members of the Water Works Board, of Toledo, informally discussed several plans for improving the city's water supply, and requested some advice on the subject.

The Board was unanimous in recommending that an experienced sanitary engineer be secured to report upon all feasible projects, and that this should be the first step taken.

The Secretary presented plans prepared by Mr. J. P. Force, Consulting Engineer, for a system of sewerage and sewage purification works for the village of Celina, and a report of the Engineer, Mr. Flynn, upon his inspection of the proposed sewers.

The Secretary also presented plans for sewers for Sewer Districts Nos. 3 and 4, of the village of Conneaut, as prepared by Mr. George S. Pierson, Consulting Engineer, together with the Engineer's (Mr. Flynn's) report of his inspection of the location and outlet of the proposed sewers. Referred to executive session.

The Secretary stated that the question had been raised as to whether in the introduction of public water supplies an emergency intake for fire purposes is to be considered as a part of the source of supply and is to be submitted to the State Board of Health for approval.

On motion of Dr. Chapman it was voted that all emergency intakes must be approved by the Board.

The Board then went into executive session.

The minutes of the previous meeting were read and approved.

On motion of Mr. Hartzell, and seconded by Dr. Warner, it was voted to approve the plans presented by L. E. Chapin for a public water supply for the city of Wellsville.

Those voting in the affirmative were Messrs. Gemmill, Stanton, Hartzell, Warner, Crossland and Chapman. In the negative, none.

On motion of Dr. Stanton, and seconded by Dr. Chapman, it was voted to approve the plans presented by L. E. Chapin for a system of sewers and sewage purification works for the village of Ashland.

Those voting in the affirmative were Messrs. Gemmill, Stanton, Hartzell, Warner, Crossland and Chapman. In the negative, none.

On motion of Mr. Hartzell, and seconded by Dr. Crossland, it was voted to approve plans for a public water supply for the village of Mantua, as presented by L. E. Chapin.

Those voting in the affirmative were Messrs. Gemmill, Stanton, Hartzell, Warner, Crossland and Chapman. In the negative, none.

On motion of Mr. Hartzell, and seconded by Dr. Warner, it was voted to approve plans for a system of sewers and sewage purification works for the village of Celina, as presented by J. P. Force, subject to the following condition, to-wit: That if at any time it should become necessary, in the opinion of the State Board of Health, to provide for a higher degree of purification of sewage than will be effected by the present purification plant, in order to prevent the creation of a nuisance, such additions to said plant shall be made as may be required to purify the sewage to a degree satisfactory to the State Board of Health.

Those voting in the affirmative were Messrs. Gemmill, Stanton, Hartzell, Warner, Chapman and Crossland. In the negative, none.

On motion of Dr. Stanton, and seconded by Mr. Hartzell, it was voted to approve plans for sewers for Districts Nos. 3 and 4, of the city of Conneaut, as presented by George S. Pierson, subject to the condition that the sewage is to be purified in a manner satisfactory to the Board whenever, in the opinion of the Board, this may become necessary.

Those voting in the affirmative were Messrs. Gemmill, Stanton, Hartzell, Warner, Crossland and Chapman. In the negative, none.

On motion of Dr. Warner, and seconded by Dr. Stanton, it was voted to reaffirm the Board's former action in disapproving plans for a sewer for Walbridge Park of Toledo, as presented by the City Engineer of Toledo, unless provision be made to purify the sewage in a manner satisfactory to the Board.

Those voting in the affirmative were Messrs. Gemmill, Stanton, Hartzell, Warner, Crossland and Chapman. In the negative, none.

The Secretary was authorized to employ a janitor at a reasonable salary.

There being no further business the Board adjourned.

Attest: C. O. Probst, *Secretary.*

REPORT OF THE SECRETARY.

To the President and Members of the Ohio State Board of Health,

Gentlemen: — Your Secretary begs leave to present the following report:

Pursuant to instructions, the Engineer and Chemist were sent to Lancaster to investigate the public water supply. They have submitted a report with the following conclusions:

1. The city wells are thoroughly polluted with sewage more or less oxidized.

2. The city wells show greater pollution from sewage than does the water of the public supply.

3. Part of the gallery water is derived from the subsurface drainage of the city, and part from the surface or subsurface water of the lowland between the river and the canal.

4. That portion of the gallery water derived from the subsurface flow of the city is in its present degree of purification usable, but is certainly undesirable and is a menace to the public health.

5. As long as the surface or subsurface water of the lowland continues to be polluted with sewage, so long will it be an undesirable adjunct to the city water.

6. In times of high water there is a far more intimate connection between the gallery and the surface water than is desirable or safe.

The results of the investigation were communicated to the board of health of Lancaster, and to Dr. Harmon, who made complaint against the supply.

Since our last meeting, June 27th, the Secretary has made but two investigations — one of an outbreak of typhoid fever at Hiram, the other of smallpox at Utica. The former will be dealt with in a special report. The latter needs no extended comment.

A man who had been attending the Epworth League meeting in California was attacked by smallpox on his way home to Utica. The eruption appeared on the night he reached Mt. Vernon, where he stopped at a hotel. On the following day he reached Utica, and met many people. On the day after he was quarantined for smallpox. I concurred in the diagnosis, and gave proper instructions to the local health authorities.

The Engineer has been sent to the following places: Columbus Grove, Bellefontaine, Wellsville and Mantua, to investigate proposed public water supplies; and to Celina and Conneaut to investigate proposed sewerage systems.

The President visited Upper Sandusky in reference to proposed sewers. Mr. Hartzell investigated the water supply of Akron. Dr. Chapman visited Prairie Depot in reference to a proposed water supply, and Bellevue and Walbridge to inspect nuisances due to defective drainage. Dr. Stanton inspected Sewer Districts Nos. 13 and 14 of Cincinnati, for which sewers are proposed. All of these investigations have been reported upon, or are to be at this meeting.

Medical Inspectors investigated smallpox, at the request and expense of the local authorities of Graysville, Magnolia and Urbana.

During June and July there were reported 610 cases of smallpox and ten deaths. The disease was present in 64 places and 33 different counties. In August, to the 19th, there were 31 cases reported. The health officer of Cleveland reported August 17th that no cases of smallpox had been reported in that city since July 20th.

The new quarters of the Board are about ready for occupancy. I hope to move in the first week in September.

Respectfully submitted,

C. O. Probst, *Secetary.*

OCTOBER MEETING.

A regular meeting of the State Board of Health was held at the office of the Secretary, Columbus, October 16th, 1901.

The meeting was called to order at 8 p. m. by Dr. Gemmill.

All members of the Board were present.

The minutes of the last meeting were read and approved.

The Secretary presented his quarterly report which was ordered filed for publication.

At this juncture Dr. Byron Stanton, who had been elected President at the June meeting, took the chair.

The Secretary reported that the following plans had been approved by the Board by mail vote:

Plans for a water supply for the village of Salineville.

Plans for water filters for the city of Newark.

Plans for sewerage for Upper Sandusky, which were approved at the meeting of the Board held in June, 1901, subject to a favorable report by a committee appointed to inspect the location of the proposed sewers: Said committee having reported in favor of approving the plans, notice was duly sent to the authorities of Upper Sandusky.

He requested that these matters be taken up and disposed of by a *viva voce* vote, confirming the action already taken in each case.

It was moved by Dr. Warner, and seconded by Dr. Crossland, that plans for a water supply for the village of Salineville be approved.

Those voting in the affirmative were Messrs. Warner, Crossland, Chapman, Hartzell, Stanton, Miller and Gemmill.

In the negative, none.

It was moved by Dr. Chapman, and seconded by Mr. Hartzell, that the plans for water filters for the city of Newark be approved.

Those voting in the affirmative were Messrs. Chapman, Hartzell, Warner, Stanton, Gemmill, Miller and Crossland.

In the negative, none.

It was moved by Mr. Hartzell, and seconded by Dr. Warner, that the plans for a sewerage system for Upper Sandusky be approved.

Those voting in the affirmative were Messrs. Hartzell, Warner, Stanton, Miller, Crossland, Gemmill and Chapman.

In the negative, none.

The Secretary presented a report upon measures to be taken by local boards of health for the prevention of smallpox.

On motion of Dr. Chapman it was voted to adopt the report and the Secretary was ordered to have it printed for distribution.

Dr. Crossland presented plans for a sewer proposed for the northwestern sewer district of the city of Zanesville.

It was moved by Dr. Warner, and seconded by Mr. Hartzell, that said plans be approved subject to the condition that the sewerage be carried to the river and a submerged outlet be constructed.

Those voting in the affirmative were Messrs. Warner, Hartzell, Chapman, Gemmill, Stanton, Miller and Crossland.

In the negative, none.

The President appointed the following as members of the Finance Committee: Messrs. Warner, Chapman and Hartzell.

On motion of Dr. Warner it was voted to hold a joint meeting between the State and local boards of health in Columbus, in January, 1902.

The Secretary was instructed and authorized to make all arrangements for the meeting.

On motion it was voted to adjourn until November 14, 1901.

Attest: C. O. PROBST, *Secretary.*

QUARTERLY REPORT OF THE SECRETARY.

To the President and Members of the Ohio State Board of Health,

GENTLEMEN: — Your Secretary respectfully reports as follows:

October 1st, I went to Union City to investigate an outbreak of suspected smallpox. I met there, by appointment, Dr. Hurty, the Secretary of the Indiana State Board of Health.

I learned that a man named Frank Worth had come there from Coldwater, Mercer County, Ohio, August 18th, and soon after that had an attack of some eruptive fever. When examined this man showed unmistakable evidence of having had smallpox. Some thirteen or fourteen other cases of an eruptive disease were directly traceable to this case. These cases were examined by seven physicians the day before I went there and pronounced *impetigo contagioso.* An examination of the patients showed the disease to be smallpox. Dr. Hurty agreed in this diagnosis.

A meeting of the board of health was called, and proper instructions given for combating the disease. They agreed to enforce the measures recommended.

It was reported that a number of cases of the same disease existed in the adjoining township of Jackson. I found the township clerk, who agreed to have these cases at once investigated by a physician, and to call a meeting of the board of health to devise proper measures to be taken.

October 9th, I received a letter from the health officer of Union City, stating that it was reported that there were a large number of cases of what was being called chickenpox in Jackson township, which he feared were smallpox, and that no quarantine was being enforced. Accordingly I returned to Union City on October 10th, and with a member of the township board of health visited a school in which thirty or more cases of the disease had occurred. None of these children had been absent from school. Two of the children, only, presented an eruption, the others having recovered. These two cases were unmistakably chickenpox. No adults in the township, so far as could be learned, had been affected. None of the cases were traceable to Union City. The outbreak was undoubtedly one of chickenpox.

A few additional cases of smallpox had occurred in Union City, one or two quite well marked cases, and some, at least, of their physicians, admitted that the disease was undoubtedly smallpox.

October 14th, I was called to Carey by the board of health. I found one case of smallpox contracted from cases at Findlay. There were a number of cases of scarlet fever. There was a dispute in diagnosis in regard to the scarlet fever cases. The disease had been prevailing in mild form for some time, but two severe cases had developed, and the citizens were much excited. I examined a number of cases, and they were undoubtedly scarlet fever. Four cases had just developed in children attending school.

I was requested to examine the ventilation of the school building. I had made such an examination ten years ago, and found practically no changes. The Smead system, with the dry closet, is in use. At first examination, spoken of above, I demonstrated that foul air from the closets was entering the school rooms. The superintendent reported that since they had discarded gas and had used coal for heating there was still greater trouble from back draughts. I advised independent ventilation for the closets, or the substitution of water closets.

A meeting of representatives of the council, board of health, and board of education was held. It was arranged to close the school for at least one week, and disinfect all the rooms, books, slates, etc.; to enforce absolute quarantine in all cases of scarlet fever, allowing the head of the family, if he desired and if well, to leave his home, but not to return to it. Proper instructions were given relative to the smallpox case.

Other visits have been made on account of smallpox, as follows:

October 2d, Dr. Laudick was sent to Coldwater. It will be remembered that the Union City cases had their origin from this place, and correspondence developed that they still had some eruptive disease there. Dr. Laudick found smallpox in three families.

October 1st, Dr. Moninger went to Findlay at the expense of the local board of health. He found a number of cases of smallpox, all traceable to a man named Bailey, who contracted the disease in Oklahoma. They were all among "Christian Science" believers.

The total number of cases at Findlay to date is 21. Seven of these have been discharged. I have learned to-day (October 16) of seven or eight cases in Marion township, near Findlay.

October 11, Dr. Moninger went to Newark, at the expense of the local board of health, to examine suspected smallpox. A bad condition of affairs was found. It seems that a woman named Kennedy escaped quarantine at Marietta, Ohio, on July 21, 1901, and went to Newark and was taken with smallpox. A number of cases, now entirely recovered, resulted from exposure to this case. Six cases ill with smallpox were found. A full list of all the cases now existing in Newark has not yet been obtained.

The disease was carried to Hanover Township, and eight cases were found there by Dr. Moninger. Another case was found in Newton Township. All these cases were traceable to the woman from Marietta. I have written to the health officer of Marietta for full particulars of this case, and would suggest that Mrs. Kennedy be prosecuted, if it is found possible to make a case against her.

Since the last meeting of the Board, August 21, 1901, smallpox has been reported in Ohio, as follows:

	CASES.		DEATHS.
Center township, Wood county	10		....
Cedarville Tp., Greene county	1		....
Cleveland, Cuyahoga county	1	family	....
Coldwater, Mercer county	5		....
Columbus, Franklin county	2		....
Findlay, Hancock county	21		....
Gibsonburg, Sandusky county	25		....
Hanover township, Licking county	8		....
Loudon township, Seneca county	4		....
Madison township, Sandusky county	1		....
Madison township, Richland county	2		....
Marion township, Hancock county	8	?	....
Mineral City, Tuscarawas county	2		....
Newark, Licking county	13	?	....
Newton township, Licking county	1		....
Richland township, Logan county	3		....
Sidney, Shelby county	2		....
St. Marys, Auglaize county	2		....
Union City, Darke county	17		....
Waynesburg, Stark county	1		....
Youngstown, Mahoning county	2		....
Zanesville, Muskingum county	1		....
Total	132		....

Investigations have been made by members of the Board, as follows:

August 23rd, Dr. Warner inspected the Ross County Infirmary.

September 7th, Dr. Chapman investigated an alleged nuisance at Norwalk.

October 5th, Dr. Stanton investigated a nuisance at Manchester.

Reports of these investigations have been presented.

October 10th, the Engineer visited Clyde to investigate the alleged pollution of a creek by factory waste and the effluent from the sewage disposal beds of Clyde. His report is in my hands. No special action is required in this case.

Plans for water supplies and sewerage for the following places have been acted upon by the Board by mail vote; and the act of the Board in each case should now be confirmed by *viva voce* vote:

Salineville, an addition to the public water supply to be obtained from a dug well about one and one-half miles from the village, voted to approve plans provided proper precautions be taken to protect the well against future contamination.

Newark, plans were approved for the installation of filters to purify the public water supply.

At the June meeting of the Board plans for sewers for Upper Sandusky were approved subject to a favorable report by the committee, Dr. Gemmill, after inspection.

The committee reported in favor of approving the plans and notice was sent to the authorities of Upper Sandusky. It would be proper now to make a record, by *viva voce* vote, confirming this approval.

The Building Commission refused to place gas and water in the laboratories: I have had this done at an expense of $85. There will be an additional expense for putting in a sink.

Some unavoidable expenses have been incurred in fitting up the new offices. There are still some things very much needed; and several hundred dollars will be required to properly fit up the laboratories.

Mr. Horton has submitted a report for six months' work in the laboratory, which I present herewith.

Respectfully submitted,
C. O. PROBST, *Secretary.*

NOVEMBER MEETING.

A special meeting of the State Board of Health was held at the Neil House, in Columbus, Ohio, at 12 o'clock, noon, Thursday, November 14th, 1901.

There were present Drs. Stanton, Gemmill, Chapman and Warner.

The Secretary presented a report upon the water supply of Bradner, which the Board had been asked to approve. The Secretary recommended that the supply be disapproved.

It was moved by Dr. Warner, and seconded by Dr. Gemmill, that the present supply be disapproved.

Those voting in the affirmative were Messrs. Stanton, Chapman, Gemmill and Warner.

In the negative, none.

Plans were presented by the Secretary for a water supply for the village of Plymouth, to be obtained from a branch of the Huron River.

It was moved by Dr. Chapman, and seconded by Dr. Warner, that the plans be approved subject to the following conditions, to-wit: That the water be purified in a manner satisfactory to the State Board of Health, and that the plans for such purification be submitted to and receive the approval of said Board.

Those voting in the affirmative were Messrs. Stanton, Chapman, Gemmill and Warner.

In the negative, none.

The Secretary presented plans for a public water supply for the village of Columbus Grove, to be obtained from deep wells.

It was moved by Dr. Gemmill, and seconded by Dr. Chapman, that the plans as presented be approved.

Those voting in the affirmative were Messrs. Gemmill, Warner, Stanton and Chapman.

In the negative, none.

Dr. Gemmill moved, and it was seconded by Dr. Warner, that the plans for an emergency intake for fire purposes for the village of Cuyahoga Falls, as presented for the village by Mr. L. E. Chapin, Consulting Engineer, be disapproved.

Those voting in the affirmative were Messrs. Chapman, Warner, Gemmill and Stanton.

In the negative, none.

Dr. Chapman presented plans for proposed changes in the sewerage system of the village of Maumee.

It was moved by Dr. Warner, and seconded by Dr. Gemmill, that these plans be approved subject to the condition that no sanitary sewage should be permitted to enter the sewer about to be constructed.

Those voting in the affirmative were Messrs. Stanton, Gemmill, Warner and Chapman.

In the negative, none.

The Secretary recommended that arrangements be made, if possible, for a joint meeting between the State Board of Health and the Superintendents of Public Schools, to discuss the subject of school hygiene.

On motion of Dr. Warner it was voted to instruct the Secretary to take steps to arrange for such a meeting, if possible, the time and place to be fixed by the President and Secretary.

No further business presenting, the Board adjourned.

C. O. Probst, *Secretary.*

Attest:

PUBLIC WATER SUPPLIES.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR COSHOCTON.

Application having been made for the approval of an additional water supply for the city of Coshocton, the Engineer was sent there to make an investigation. He presented the following report:

The new supply is to be taken from the same source as formerly used, but by means of a large dug well instead of by gangs of driven wells. Formerly the supply was from twenty-two 6-inch wells, driven 31 to 32 feet into a sand and gravel bed lying between the Tuscarawas River and the Walhonding Creek. These wells failed to give sufficient water more from the difficulty of maintaining them together with the branching suction line than from the lack of water. This difficulty it is hoped to overcome by the new method of collecting the water.

The new well is 30 feet in diameter and 30 feet deep, walled up with stone and arched over with brick laid in cement. The crown of the arch is even with the ground and is provided with a tight cover so as to prevent the entrance of the river water during floods, which cover the whole strip of land between the two streams.

The water stands in the well 10 feet below the surface of the ground, or about at the river levels, and probably consists of the subsurface flow of the streams supplemented with some infiltration water.

The well was tested by pumping 6,000,000 gallons from it in twenty-four hours, and the level was lowered only 8 feet. As the average daily consumption is now only 1,000,000 gallons per day, and the maximum average is only 1,500,000 gallons per day, the new supply will probably be ample for a number of years.

There is no source of local pollution and the water should be of excellent character.

The new supply was being used on the day of inspection, as the suction lines to a number of the old wells were broken by the caving in of the bank around the new well.

A chemical and a bacteriological sample was taken from the new well direct and also from the discharge pipe of the pump. The latter sample may be influenced to some extent by a leak in the suction line across the river, which was not discovered until after the samples were taken. These samples were submitted to the Chemist for analysis, who reported as follows:

REPORT ON EXAMINATION OF WATER FROM COSHOCTON.

PARTS PER MILLION.

	Well.	Discharge pipe in pumping station.
Number of sample	1562	1563
Color	.10	.10
Turbidity	none	none
Sediment	mere trace	mere trace
Odor	none	none
Oxygen required	.62	.58
N. as ammonia free	.006	.005
N. as ammonia albuminoid	.025	.023
Nitrogen as nitrates	.31	.31
Nitrogen as nitrites	trace	trace
Chlorine	5.5	5.6
Alkalinity	195.6	194.8
Incrusting constituents	11.6	15.6
Total solids	253.	245.
Volatile and combustible	96.	101.
Bacteria per c. c	110.*	55.*

*No colon.

The analyses show that the two samples are from the same water. The results show a subsurface water of very good quality, and one that is suitable for addition to the present supply of Coshocton.

At a meeting of the State Board of Health, held January 15, 1901, this additional source of water supply was approved, and notice of said action was sent to the Superintendent of the Water Works of Coshocton, January 29, 1901.

REPORT ON EMERGENCY INTAKE FOR CUYAHOGA FALLS WATER WORKS.

The Board of Water Works Trustees, through the Consulting Engineer, Mr. L. E. Chapin, made application for approval of the use of water from the Cuyahoga River for emergency fire purposes, the use of such water to be under such regulations as the State Board of Health might deem advisable.

The Engineer, Mr. Flynn, was sent to Cuyahoga Falls October 19, 1901; inspected the proposed intake site in company with Mr. G. R. James, Secretary of the Water Works Trustees, and made the following report:

It is proposed to put in a 10-inch suction pipe to the Cuyahoga River in the back-water of the uppermost dam. This suction line is to be used only in cases of emergency, such as a large fire, and its installation is especially desired in order to obtain a low insurance rate. It is believed that the pipe will not have to be used except in very exceptional cases, as the wells are good for from 300 to 350 gallons per minute, or approximately 500,000 gallons per day.

As a further protection against fire, there are a number of water mains through the business and manufacturing district that are connected with the pumps of four of the mills. These have been left in place and, it is claimed, can still be used in case of fire.

Mr. Orlando Wilcox, Village Solicitor, who was consulted in regard to the necessary regulations in regard to the use of the proposed intake, stated that all requirements would be cheerfully complied with.

The water works pumping station is on the east bank of the river, above practically all local pollution, except the indirect drainage from a few closets, barn-yards, etc. At the station there is at present a closet built over the bank of the river, but it is claimed that this is a temporary arrangement and that it will be removed.

The most serious pollution of the stream is at Kent, some seven miles above, where it is estimated that private sewers carry to the river the sewage of some 300 people together with some objectionable manufacturing refuse.

At the time of inspection the water at the proposed intake was clear but seemed rather highly colored from vegetable matter, due, no doubt, largely to the falling leaves. No evidence of serious pollution was noticeable.

A chemical and a bacteriological sample was taken, and examined by the Chemist, Mr. Horton, who reported as follows:

REPORT OF EXAMINATION OF WATER FROM CUYAHOGA FALLS.

PARTS PER MILLION.

	Cuyahoga River.
Number of sample	1932
Color	.32
Turbidity	slight
Sediment	slight
Odor	vegetative
Oxygen required	4.02
N. as ammonia free	.052
N. as ammonia albuminoid	.186
Nitrogen as nitrates	trace
Nitrogen as nitrites	.002
Chlorine	3.1
Alkalinity	134.
Incrusting constituents	16.
Total solids	241.
Volatile and combustible	67.
Bacteria per c. c.	1000.*

*Intestinal bacteria present.

This sample was received on the 21st of October, having been collected by Mr. Flynn at the time of his investigation. These results do not show a large amount of pollution at this time, but there is some evidence of pollution. The water of the present sample is not a suitable water to add to a public supply, as the analysis indicates sewage pollution and intestinal bacteria were present. The results of the studies recently made on the larger streams of the State show that in general the best analyses are obtained just prior to the fall rains. While the Cuyahoga River was not one of those studied, we may assume the same conditions would be found there, and that the present sample would be one of the best attainable at the place of sampling.

The Board voted to disapprove such fire emergency intake, and notice of this action was sent to the Consulting Engineer, Mr. Chapin, December 11, 1901.

REPORT UPON PROPOSED WATER SUPPLY FOR GENEVA.

The village of Geneva requested the Board to investigate a proposed water supply for said village; two sources having been proposed. Dr. W. C. Chapman and the Engineer, Mr. Flynn, were appointed a committee to investigate and report. They submitted the following preliminary report:

The committee visited Geneva August 25th, 1900, and investigated the proposed supplies in company with the mayor and water committee of council.

The two sources proposed are, one from Cowles Creek, by means of an impounding reservoir, and the other from Grand River at a point 3½ miles south of Geneva, near Roger's Corners. On account of lack of data concerning these supplies it is not possible to make a report until further work has been done by the officials of Geneva. From the rough survey of the situation it was seen that it is possible to obtain a sufficient quantity of water from Grand River at the point named but the quality is in question and if this source is to be considered by the village, analyses must be made of the water to determine its quality. It would be advisable to have estimates made of the low flows of the stream so as to determine the reservoir capacity required.

Concerning the Cowles Creek supply much more information must be secured. Conditions seem to be favorable for impounding the run-off of this stream at a point less than one mile from the village, but beyond this nothing can be stated. It appears that the creek has a watershed of 5 to 6 square miles on which there is nothing but a scattered rural population. Before a report can be made it will be necessary to know the exact area of the watershed, the exact location and number of people and stock of all kinds, a map showing these features, the character of the soil of the whole area, the amount of timber, approximate contours if possible, the geological formation of the area to be flooded, etc. This information is necessary to determine the character of the water to be expected, the amount of same and the chances for the construction of an impounding reservoir of suitable capacity that will retain the water after it is impounded. Some of these questions are for the local engineer only, but all are necessary for the proper solution of the problem.

It is respectfully recommended that the substance of this report be sent to the officials of Geneva, or their representative, so that such steps as are necessary can be taken for the gathering of complete data concerning their proposed supplies. Until this information is furnished nothing definite can be reported.

Sufficient information being unobtainable at that time the committee again visited Geneva, and on September 19, 1900, reported as follows:

From all information obtainable it is believed that Cowles Creek, at the proposed reservoir site, has a drainage area of 3.1 square miles and that it contains some one hundred people and about one hundred and fifty head of stock, not including hogs and sheep. On account of the small size of the drainage area and the great trouble which will be experienced in preventing pollution, it is not considered advisable to use Cowles Creek.

The other project, i. e., the use of water from Grand River at a point due south of Geneva and near Rogers' Corners, seems to be more favorable for the securing of a sufficient supply of potable water. The drainage area of the river at the point in question is given as 325 square miles, which, with the impounding secured from the mill dams, ought to furnish an ample supply of water for the present. If at any time the supply should run short it would be feasible to increase the amount impounded or to increase the reservoir capacity. From the report of the Chemist it appears that the water is now barely potable but would be improved by filtration or sedimentation. It is not deemed absolutely necessary to filter the water at present, but this requirement is made conditional on the character of the water in the future and if at any time in the opinion of the State Board of Health the water shall require filtration such filters shall be installed as will meet the approval of the Board.

It is recommended that the supply from Grand River at the point above described be approved with the condition that such suitable sedimentation basins be constructed as will allow the water at least twenty-four hours sedimentation. This is the minimum requirement and the basins should therefore be made much larger than the present estimated consumption would demand so as to allow for future increase.

It is further recommended that the reservoir should be divided into at least two sections so that one can be cleaned without disturbing the water in the other. It would no doubt be more economical to construct the reservoir, or reservoirs, on high ground near the river, pump the water to them and allow it to flow by gravity to the village. This method will require a larger main from the river to the village, so as to allow a quick response to the fluctuations in the demand, than would be necessary if the reservoirs were close to the village and the water pumped from them direct to the mains, as it is understood that there is no ground of sufficient height near the village. A ready response to the fluctuations could be secured by erecting a standpipe on the supply main near the village and it will have to be determined by the local engineer whether it would be cheaper to put in a large main or a small one and the standpipe.

Samples of water from Grand River at Geneva were submitted to the Chemist for analysis, who reported as follows:

REPORT OF EXAMINATION OF WATER FROM GENEVA.

PARTS PER MILLION.

	Above dam.	Below dam.
Number of sample	1327	1328
Color	.24	.24
Turbidity	.16	.15
Sediment	slight	slight
Odor	vegetative	vegetative
Oxygen required	5.63	5.70
N. as ammonia free	.030	.038
N. as ammonia albuminoid	.243	.252
Nitrogen as nitrates	trace	trace
Nitrogen as nitrites	trace	trace
Chlorine	3.2	3.2
Alkalinity	84.8	83.4
Incrusting constituents	1.8	9.2
Total solids	178.	183.
Volatile and combustible	62.	57.
Bacteria per c. c	900.	850.

These samples were received from the Consulting Engineer, Mr. J. B. Strawn, on September 5th. The results of the analyses indicate freedom from sewage contamination beyond the minor influence from the rural population and the domestic animals on the watershed. Intestinal bacteria were found only in the sample taken below the dam, and in it but very sparingly, probably having come from animal pollution. The number of bacteria is not high, especially if the rain reported to have fallen in that neighborhood affected the stream above the sampling points. It is reported to us that a considerable rainfall occurred just previous to the collection of the samples. From the results in comparison with our findings on other streams of this State it would seem that the rain was local and did not influence the stream above the sampling points or else the river drains an area unusually clean and free from clay and silt. In support of my view that the present samples do not show the maximum amount of organic matter carried by the water of Grand River, reference is made to the analysis made of a sample by Prof. Mason in January, 1897, which contained more organic material than the present samples.

While the organic matter (chiefly vegetative in form) and the physical properties of these waters are not bad for an open stream in this State, they are, however, not desirable in a public supply, but with the suspended matter removed this water ought to make a very acceptable supply as far as quality is concerned.

Whether sedimentation alone would be efficient is not shown by the limited information at hand. Sedimentation of sixteen hours decreased the turbidity to less than .06. While the water is an extremely soft one for an Ohio stream, yet it contains an alkalinity sufficiently high to leave a good margin of safety for the use of coagulant if mechanical filtration is used.

The result would indicate an undesirable water in the raw state, but with a treatment to remove the bacteria, organic matter and other suspended material this water ought to be a very satisfactory one for a public supply.

The Board voted to approve the plans for a water supply to be obtained from Grand River upon the condition "That it be purified by filtration, or otherwise, in a manner satisfactory to the State Board of Health. Notice was also given November 1st, 1900, that plans for purification of the proposed supply must be submitted to and approved by the Board.

At a meeting of the Board, held April 11, 1901, a request from the council of Geneva, signed by five members thereof, was presented, asking the Board to approve plans for a public water supply to be obtained from Cowles Creek.

The Secretary stated that a dispute had arisen as to the extent of the watershed of Cowles Creek and the amount of water that could be obtained by an impounding dam; that the Engineer had visited Geneva to obtain necessary data upon this point, and had reported as follows:

The watershed area has been taken from a map furnished by the village engineer, Mr. B. F. Hewitt, and found by careful planimeter measurements to check within one-tenth of a square mile of the area estimated by the above engineer, namely 7.6 square miles. Owing to the rough way in which the line was located this discrepancy is of no importance and the area as given was assumed as correct.

By the last census Geneva had a population of 2,342. It is proposed to supply 100 gallons per capita for a population of 2,500 or 250,000 gallons daily. Considering the rate of growth of this village and the fact that every service is to be metered, this should be an ample allowance for many years to come.

The figures for the rainfall have been taken from the U. S. Weather Bureau reports at the following stations, which surround the watershed in question:

Ashtabula—Ten miles east of Geneva.
Colebrook—Twenty miles southeast of Geneva.
Hillhouse—Thirteen miles southwest of Geneva.
Perry—Eleven miles west of Geneva.

The following table gives the total rainfall in inches per month and the total per year for six years, the same being taken as the average of the four stations surrounding the watershed:

RAINFALL IN INCHES.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1900	2.95	3.41	1.92	1.88	1.89	1.86	5.98	2.07	2.11	2.10	4.50	1.54	32.21
1899	2.84	2.45	4.02	1.06	6.02	2.62	3.45	0.69	4.45	2.38	1.52	5.76	37.27
1898	3.46	2.43	4.02	2.04	2.63	3.16	2.79	5.18	3.00	4.72	4.05	3.11	40.59
1897	3.02	2.50	2.83	2.34	3.90	1.94	7.16	6.46	0.80	1.70	6.07	2.68	41.40
1896	1.64	3.62	3.70	3.34	2.16	5.54	6.12	3.16	5.18	1.84	3.13	1.87	41.28
1895	4.13	1.63	1.76	1.60	2.88	2.51	2.75	3.49	4.53	2.29	4.62	4.19	36.38
Average	3.01	2.67	3.04	2.04	3.25	2.94	4.71	3.51	3.34	2.50	3.98	3.19	38.19

The percentage of water running off of this watershed each month was secured from the average results for other Ohio streams. While these figures were obtained from larger streams than the one in question, it is safe to use the figures as the discrepancy will be a factor of safety. The percentages assumed are as follows:

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
78	50	92	61	10	15	3	12	1	1	4	42	31

Using these percentages the estimated run-off in inches per month is as follows:

RUN-OFF IN INCHES.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1900	2.30	1.70	1.77	1.15	0..19	0.28	0.18	0.25	0.02	0.02	0.18	0.65	8.69
1899	2.22	1.22	3.70	0.65	0.60	0.39	0.10	0.08	0.04	0.02	0.06	2.42	11.50
1898	2.70	1.22	3.70	1.24	0.26	0.47	0.08	0.62	0.03	0.05	0.16	1.31	11.84
1897	2.36	1.25	2.60	1.43	0.39	0.29	0.21	0.78	0.01	0.02	0.24	1.13	10.71
1896	1.28	1.81	3.40	2.04	0.22	0.83	0.18	0.38	0.05	0.02	0.12	0.78	11.13
1895	3.22	0.82	1.62	0.98	0.29	0.38	0.08	0.42	0.04	0.02	0.18	1.76	9.81
Average	2.35	1.34	2.80	1.25	0.32	0.44	0.14	0.42	0.03	0.02	0.16	1.31	10.62

In the following table the total run-off in gallons per month has been computed from the run-off in inches per month:

RUN-OFF IN MILLION GALLONS PER MONTH.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1900	303.6	224.4	233.6	151.8	25.1	37.0	23.8	33.0	2.6	2.6	23.8	85.8	1317.4
1899	293.0	161.0	488.4	85.8	79.2	51 5	13.2	10.6	5.3	2.6	7.9	319.4	1518.0
1898	356.4	161.0	488.4	163.7	34.3	62.0	10.6	81.6	4.0	6.6	21.1	172.9	1562.9
1897	311.5	165.0	343.2	188.8	51.2	38.3	27.7	103.0	1.3	2.6	31.7	149.2	1413.7
1896	169.0	238.9	448.8	269.3	29.0	109.6	23.8	50.2	6.6	2.6	15.8	103.0	1469.2
1895	424.0	108.2	213.8	129.4	38.3	50.2	10.6	55.4	5.3	2.6	23.8	232.3	1294.9
Average	310.2	176.9	369.6	165.0	42.2	58.1	18.5	55.4	4.0	3.3	21.1	176.9	1401.8

Evaporation was computed with the assumption that the surface of the reservoir was 19 acres, which figure was obtained by allowing an average depth of 10 feet for a 60,000,000 gallon reservoir.

On the yearly average the evaporation will be compensated for by the rainfall but as the greatest evaporation is experienced during the dry months attention must be given it here during July, August, September, October and November. For these months the estimated evaporation is 6.21, 5.97, 4.86, 3.47 and 2.24 inches respectively.

(From Fitsgerald's experiment's and the U. S. Weather Bureau.)

Deducting from this the rainfall of these months we have a deficiency, due to evaporation, as follows:

July.	August.	September.	October.	November.
2.76	5.28	0.41	1.09	0.72

inches, which reduces the run-off for these months in 1899 to the following:

RUN-OFF IN MILLION GALLONS, LESS EVAPORATION.

July.	August.	September.	October.	November.
11.8	8.0	5.1	2.1	7.5

For July, August and November there would be available practically no extra water, while a large deficiency for September and October would have to be supplied by storage.

From these estimates it is seen that the creek will furnish an abundance of water except for from two to four months in the summer and fall and that with a storage reservoir as proposed there will be sufficient for such periods.

If as claimed by some, this watershed is of such character that there is no run-off in the months of July, August, September and October, there will still be water enough in the spring months for storage to carry over the dry season.

No allowance was made for percolation as it was stated that the reservoir would be made tight. Some percolation will be counter-balanced by the seepage from the high ground above the lower part of the reservoir.

It must be borne in mind that the above estimates are based on figures as submitted by the Geneva authorities. If the watershed area is too large the above figures must be reduced accordingly. The effect of evaporation will be increased by a larger area of the reservoir than assumed and percolation must be considered if the embankments are not absolutely tight. It must be noted also that there may be but little opportunity for filling the reservoir after May or June, depending on the rainfall, and unless the same can be completed before that time, a supply cannot be expected before sometime in December.

The matter was referred to the committee previously appointed to consider plans for a water supply for Geneva.

Nothing further came of the project to obtain a supply from Cowles Creek and the Grand River supply was adopted.

Up to this time the Board has not been called upon to approve plans for filtration of the water supply of Geneva.

REPORT ON ADDITIONAL WATER SUPPLY FOR IRONTON.

Application was made by the City Engineer of Ironton to approve an addition to the water supply of said city, to be obtained from drilled wells located within the Sixth Ward of that city.

A sample of the water from a well at the Ironton Door and Manufacturing Company's plant in the Sixth Ward was furnished for examination. The Chemist reported as follows:

REPORT OF EXAMINATION OF WATER FROM IRONTON.

PARTS PER MILLION.

Number of sample	1678
Color	.15
Turbidity	none
Sediment	none
Odor	none
Oxygen required	.22
N. as ammonia free	.001
N. as ammonia albuminoid	.063
Nitrogen as nitrates	none
Nitrogen as nitrites	.022
Chlorine	2.7
Alkalinity	143.
Incrusting constituents	60.
Total solids	267.
Volatile and combustible	83.
Iron	.1
Bacteria per c. c	60.*

*Colon not present.

This sample was received on May 17th, 1901, from Mr. F. G. Leete, City Engineer of Ironton. The analysis revealed the findings given above. This water is considerably harder than that in the Ohio River at Ironton, but is softer than a number now used in the State. The nitrogen as nitrites is high and does not accord with the other findings, and it is desirous to have another sample in order to determine if the nitrites persist. Aside from the nitrites and the moderate hardness this water was found to be a very satisfactory one for a public supply as far as quality is concerned. Before expressing a final opinion I should wish to examine a second sample.

This sample not proving satisfactory, a second sample was obtained on June 6th, which was reported upon as follows:

REPORT OF EXAMINATION OF WATER FROM IRONTON.

PARTS PER MILLION.

Number of sample	1699
Color	trace
Turbidity	none
Sediment	none
Odor	none
Oxygen required	.32
N. as ammonia free	.032
N. as ammonia albuminoid	.015
Nitrogen as nitrates	1.08
Nitrogen as nitrites	.016
Chlorine	2.3
Alkalinity	135.
Incrusting constituents	68.
Total solids	223.
Volatile and combustible	59.
Bacteria per c. c	100.*
Iron	.2

*Colon bacilli not found.

On the whole the two samples are quite similar and yet there are some changes, chiefly in the nitrogen determinations. The objectionable points in the present analysis are the nitrites and nitrates, and it would seem that the water which eventually reaches this well had been polluted by being in the city. If the quality of the water were never to deteriorate from the present showing it could be used for a drinking water, but it is hardly up to the standard desirable for a public supply.

The Board voted to disapprove the proposed addition to the water supply of Ironton, and notice of this action was sent to the City Engineer July 2, 1901.

REPORT ON PROPOSED WATER SUPPLY FOR MANTUA.

Plans for a water supply for the village of Mantua having been filed by Mr. L. E. Chapin, Consulting Engineer for the village, Mr. Flynn, the Engineer of the Board, was sent to Mantua on August 14, 1901, and submitted the following report:

A well has been drilled in the eastern part of the village in rather low land near the Cuyahoga River. This well is 8 inches in diameter and it has been drilled through 64 feet of soil, gravel and sand, and three feet into the sandstone. The well is cased to the rock so that practically all the water has to come from that stratum. At the present time there is no local pollution and the water should be of good quality. The only objectionable feature is a rather high turbidity for a well water, but this will probably decrease after the well has been pumped for some time. Sedimentation in the reservoir will also help to clarify the water. The usual level of the water is three feet from the surface, and pumping for 43 hours at the rate of about 125,000 gallons per day lowered it only to nine feet from the surface. If this capacity would hold in the future, one well would be sufficient for the village, especially if supplemented with a good reservoir capacity for reserve in case of fire. It is proposed, however, to put down three wells in all, which will no doubt give an ample supply for some time.

There was talk of putting in an intake pipe to the Cuyahoga River, for use in case of fire or other emergency. With the large supply of good water available, this is not desirable, as there is always the tendency to use the emergency inlet whenever the regular supply gets short, instead of maintaining the latter in proper condition or increasing it to keep pace with the consumption. It is claimed that a proper elevation can be obtained for a distributing reservoir, so that a large reserve can be maintained by the construction of a suitable reservoir. If this is not sufficient a storage cistern can be constructed at the pumping station.

There is only one village of any size, Burton, population 727, on the watershed of the Cuyahoga River above the proposed intake, and the water should be of fair quality. An oil pumping station is located just above the intake, but it is claimed that no refuse is sent to the river, though at times a little does escape.

Chemical and bacteriological samples were taken from the well at the time of inspection, and submitted to the Chemist for examination, who reported as follows:

REPORT OF EXAMINATION OF WATER FROM MANTUA.

PARTS PER MILLION.

	Drilled well.
Number of sample	1837
Color	.12
Turbidity	.25
Sediment	slight (sandy)
Odor	earthy
Oxygen required	1.95
N. as ammonia free	.003
N. as ammonia albuminoid	.008
Nitrogen as nitrates	trace
Nitrogen as nitrites	trace
Chlorine	2.9
Alkalinity	101.
Incrusting constituents	25.
Total solids	300.
Volatile and combustible	51.
Bacteria per c. c	90.*
Iron	1.8

* No intestinal bacteria present.

These findings show the water to be unusually free from organic matter, as well as a comparatively soft water. The unfavorable factors are recorded in the findings for iron and physical properties, due to the soil drawn into the water of this new well. On using the well we would expect this foreign material to disappear, leaving a very acceptable water for a public supply.

At a meeting of the Board, held August 21, 1901, the new water supply for the village of Mantua, to be obtained from drilled wells in the eastern part of the village, near the Cuyahoga River, were approved, and notice was sent to the Consulting Engineer, August 23rd.

REPORT ON PROPOSED FILTRATION PLANT FOR THE WATER SUPPLY OF NEWARK.

The following correspondence in reference to improving the water supply of the city of Newark will sufficiently explain changes proposed and the action taken by the State Board of Health in reference to the matter:

Canton, Ohio, September 18, 1901.

Dr. C. O. Probst, *Secretary of State Board of Health, Columbus, Ohio.*

Dear Sir: — On behalf of the Newark Water Company, of Newark, O., I herewith make application for the approval by the State Board of Health of the proposed filtration plant for the said water company, to be installed at their station two miles north of the city of Newark.

It is proposed to install 4 units of a gravity filter plant, each with a daily capacity of 500,000 gallons, and as shown on plan No. 5765 herewith submitted.

A new river intake pipe is to be laid of 20 inch diameter from the north branch of the Licking River, to a pump well located within the filter house. From this pump well, the raw water is to be lifted to a sedimentation tank 30 feet in diameter and 24 feet in height as shown on plan No. 722, herewith submitted.

Into this tank a coagulant of sulphate of alumina will be applied by means of a small pump located on the filter room floor, and the raw water so treated after one hour sedimentation, will then be brought over on to the four filters, filtered, and the effluent delivered into the present stone well which is to be used as a clear water basin, and from which the city supply is to be taken by the service pumps.

The nominal capacity of the four filters is 2,000,000 gallons per day, while the present consumption is about 1,250,000 gallons, and increasing but slowly due to the steadily increasing use of meters on the services, but to provide for future increased demand for water, space is provided for two additional filters in the filter room, and if found desirable, another sedimentation basin will be erected similar to the one above mentioned.

As a description of the method of operation, the letter of date September 14th from the filter company is herewith submitted, as also the plans above referred to, namely 5765 and 722.

Respectfully submitted,
(Signed) L. E. CHAPIN,
Consulting Engineer for the Newark Water Co.

The three points of any particular interest in the communication from the New York Continental Jewell Filtration Company are the following:

1. That the design for the Newark plant provides for a preliminary sedimentation of over one hour, whereas the plants at Lorain, Dennison and Conneaut have a preliminary sedimentation of not over thirty minutes.

2. The Newark plant will be provided with Weston automatic controllers, by which there will be a uniform rate of flow from the filter. These are considered, and it would seem rightly, as improvements over mechanical filters already in use in this State.

3. They give a guarantee of the Newark plant that there will be 97 per cent removal of bacteria when there are 3000 or more in the applied water, and not more than 100 bacteria per cc in the effluent when there are less than 3000 in the applied water.

This was a better guarantee than they had yet given to any of their plants in Ohio, and the Secretary recommended that the plans for filters for Newark be approved by the Board.

The Board voted to approve the plans as presented, upon the condition that the filters should be so operated that there would be at least 97 per cent removal of bacteria when there are 3000 or more in the applied water, and not more than 100 bacteria per cc in the effluent when there are less than 3000 in the applied water.

Notice of this action was sent to the Consulting Engineer October 1, 1901.

REPORT ON PROPOSED WATER SUPPLY FOR PLYMOUTH.

Plans for a water supply for the village of Plymouth, Richland County, Ohio, were presented to the Board by Mr. J. B. Weddell, the Consulting Engineer.

The Engineer of the Board was sent to Plymouth to make an investigation, and reported as follows:

On November 6, 1901, Plymouth was visited and the proposed supply investigated in company with Messrs. Weddell, Fish and Mansfield, who have been retained by the village to design the plant and prepare specifications, deeds, etc.

It is proposed to obtain the supply of water from a small branch of the Huron River, which has a watershed of about three square miles in area at the proposed location of the intake. This stream has a very fair flow, considering its drainage area, on account of a number of springs which are tributary to it and also on account of the fact that the head waters of the eastern branch are impounded at Seaton Park, forming a lake two to three acres in area. There is a constant leakage from this reservoir which helps to maintain the low flow. Mr. Weddell estimated that the stream was flowing 350,000 gallons per day on September 10th and it was concluded that it was flowing nearly the same amount on the day of inspection. As it is proposed to secure a supply of only 100,000 gallons per day, this stream will no doubt furnish the same even in the driest weather, if suitable impounding and storage reservoirs are constructed.

The pollution of the stream consists of the usual drainage from a rather thickly populated agricultural district, together with the drainage from the park mentioned above. This latter consists of the washings from the general refuse scattered around a pleasure resort, and from the surface privies, especially from one located very near the stream. A large saw mill is also located on the stream just at the outskirts of the village and above the proposed intake.

While it is believed that for the periods between rains, when the stream is supplied from springs, etc., the water from this run is of very fair quality, it is quite certain that the water carrying the washings from the rains is polluted and would require purification.

No definite plans have been prepared as yet as to the manner in which it will be attempted to purify this water. Mention was made of a Jewell pressure filter and of gravel screens or embankments between the impounding reservoir and the storage reservoir and between the latter and a pump well. A gravity mechanical filter was not considered as it was desired to pump the water but once and this method would require a second pumping. Sufficient head could no doubt be secured for a slow sand filter but the cost of installation of this system was thought to be too great for the funds available.

For the water works complete there is an appropriation of $22,500, of which it is estimated that $21,000 will be needed for the plant complete, without any provision for purification.

It was further proposed that a ground water be secured from the rock formation found a short distance below the surface.

A chemical and a bacteriological sample of the run water was taken and submitted to the Chemist for examination, and he reported as follows:

REPORT OF EXAMINATION OF SAMPLE OF WATER FROM PLYMOUTH.

PARTS PER MILLION.

	Run from Neiman's springs.
Number of sample	1975
Color	.16
Turbidity	trace
Sediment	very slight
Odor	vegetative
Oxygen required	2.01
N. as ammonia free	.036
N. as ammonia albuminoid	.128
Nitrogen as nitrates	trace
Nitrogen as nitrites	.004
Chlorine	17.3
Alkalinity	268.
Incrusting constituents	21.
Total solids	441.
Bacteria per c. c	600.*

* No intestinal bacteria found.

The present sample did not indicate the presence of more than minor amounts of sewage pollutions from the drainage area of the stream. Some vegetative organic matter is present, but not in large amount. The character of the water is fair for an open stream at this season, but this character ought to be maintained if the water is used for a public supply. With treatment this water should afford an acceptable supply as regards quality.

The Board voted to approve the proposed supply, but upon the conditions:

First, that the water should be filtered in a manner satisfactory to the State Board of Health, and

Second, that plans showing the proposed method of filtration be submitted to and receive the approval of the State Board of Health.

Notice of this action was sent to the Consulting Engineer, Mr. Weddell, November 16, 1901.

No plans as yet have been presented for purification works.

REPORT ON AN ADDITIONAL WATER SUPPLY FOR SALINEVILLE.

The village of Salineville made application for approval of an addition to its public water supply. The Engineer visited Salineville and reported upon the location of the well which was to afford the additional supply.

The well is located about a mile and a half from the village, in Yellow Creek valley. It is a dug well, 31 feet deep and 28 feet to the water vein that is to be used. The soil is sand-rock with a small vein of coal and clay above. The well is walled up with brick and cemented. There are no present sources of pollution.

A sample of the water was submitted to the Chemist, who reported as follows:

REPORT OF EXAMINATION OF WATER FROM SALINEVILLE.

PARTS PER MILLION.

	Well.
Number of sample	1855
Color	.11
Turbidity	slight
Sediment	slight
Odor	none
Oxygen required	1.03
N. as ammonia free	.350
N. as ammonia albuminoid	.076
Nitrogen as nitrates	trace
Nitrogen as nitrites	none
Chlorine	2.3
Alkalinity	234.
Incrusting constituents	none
Total solids	293.
Volatile and combustible	16.
Bacteria per c. c	700.*
Iron	.8

*Colon bacilli not found.

This sample was received on the 30th of August, from Mr. James Carter, Health Officer, and Mr. W. F. Kirk, Clerk of the Water Works. The results show a water that is fairly free from organic matter and the well properly protected from the direct addition of surface water ought to furnish a potable water. The water contained an excess of carbonates with no incrusting constituents, but the water is less alkaline than some now in use in the State, and the analysis indicates a potable water from the mineral side. The free ammonia of course does not here indicate sewage pollution.

The Board voted to approve the proposed supply with the proviso that proper precautions be taken to protect the well against all future contamination.

Notice of this action was sent to the Clerk of the Water Works September 25, 1901.

REPORT ON PROPOSED WATER SUPPLY FOR WELLSVILLE.

An application was received from the Water Works Board of Wellsville, for approval of plans prepared by Mr. L. E. Chapin, Consulting Engineer, for a new water supply. A copy of a report of the Engineer, which it was stated had been concurred in by Mr. Kuichling of Rochester, N. Y., was also submitted.

Mr. Flynn, the Engineer of the Board, was sent to Wellsville on August 8th. He submitted a report, of which the following is a part; the figures bearing upon the probable quantity of water being ommitted:

The present supply is obtained direct from the Ohio River and is unsatisfactory from both high turbidity and sewage pollution. It is proposed to obtain the new supply by impounding the waters of Little Yellow Creek, at a point some three miles west of Wellsville, and conducting the same to the mains by gravity, pumping only the amount required on a high service which is to be inaugurated. At the point where the water is to be impounded the stream has a drainage area of 12.8 square miles, as determined from the watershed map submitted by the city of Wellsville, but checked in part by the writer. At the immediate reservoir site the stream occupies a deep rocky valley, which very soon, however, broadens out into a more level rolling area, under a fair state of cultivation. The soil consists of a clay loam running to clay with outcrops of shale and limestone, while the deeper parts of the stream valley are cut through sandstone.

It is estimated from the number of houses and by inquiry that the population on the watershed is about 300, part of which is found in the small hamlet of Inverness, on the southern edge of the watershed. This gives a population per square mile of 23, a figure much below the average of the State. There is no large amount of stock kept in the district, probably nothing more than the usual work horses, with a few cows and hogs, and a few sheep in the upper part of the watershed. In a few cases only was it noticed that barnyards and outhouses were located close to the creek and its tributaries. The manure seems to be hauled out several times a year so that it does not accumulate to the extent found in some districts. With a little attention to the few objectionable cases the watershed ought to be able to furnish a fair water, especially with the large storage reservoirs as proposed.

Except in times of low flows the water is very turbid but it is claimed that twenty-four hours effects a very fair clarification.

There is no doubt but that the water will be much superior to that obtained from the Ohio River.

In this connection it may be well to state that two wells have been driven into the bed of the Ohio River and an abundant supply of water obtained, but it was objected to on account of its hardness.

To impound the flow of Little Yellow Creek it is proposed to construct a 30-foot dam in a narrow defile, just below Smith's mill, forming a reservoir of some 12.5 acres in area and with a capacity of 58,000,000 gallons, 55,000,000 gallons of which will be available by drawing down the reservoir some 22 feet. From this impounding reservoir the water is to be conducted by gravity to a storage reservoir, located farther down in the valley of the creek. This is to be constructed partly in excavation and partly on fill, with a suitable levee to keep out the waters of the creek. It is to have an area of 8.5 acres with a maximum depth of 22 feet and a capacity of 33,000,000 gallons, on an average depth of about 12 feet. From this storage reservoir the water is to flow by gravity to the mains and supply the greater portion of the city in this manner. For the higher parts of the city and for fire protection in all parts, it is proposed to pump part of the water to the present supply reservoir located on a hill northwest of the city. For this purpose the pumps in the present pumping station are to be moved to a new station to be located at some point along the line from the gravity supply. The present pumping station will be abandoned together with the intake to the river.

The present population of Wellsville is estimated to be 6146. From the superintendent of the water works it was learned that the present average daily consumption for the winter and spring is 1,000,000 gallons and that for the summer and fall it is 1,500,000 gallons.

In taking up the question of the quantity of water available it is necessary to estimate the daily flow of the stream from the rainfall on the watershed, using such run-off statistics as have been obtained from the gagings in Ohio, modifying the same to suit local conditions. From the U. S. Weather Bureau reports it is found that rainfall data are available from 1893 for from three to four stations near the watershed. These are Millport, four miles west of the watershed; New Waterford, twelve miles north; Annapolis, sixteen miles southwest, and New Alexandria, twenty-one mile south of the watershed.

In Table 1 is given the available rainfall data for the above stations together with the mean for the district. In Table 2 there is collected the mean rainfall for the several years available. This matter is given in detail so as to show the method followed for the benefit of those interested in the subject. A straight average is used on the rainfall data as there is no data at hand by which they could be weighted.

These data show a low rainfall in August, September, October and November, the months when the percentage of run-off is the lowest, making the quantity of water available for these months very low. The ratio of run-off was determined from the observations made on the Maumee, Sandusky, Scioto and Olentangy rivers, increased to some extent, however, on account of the difference in size and character of the watersheds. The percentages of run-off used for the various months are as follows:

Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
78	50	92	61	10	15	8	12	1	1	4	42

Table 3 gives the inches of run-off for each month on the whole watershed for the years in which the rainfall was obtainable. Table 4 gives the same run-off in million gallons per month. While these figures seem low for the summer and fall flows, it is not thought they can be too low, according to the statements of the residents and from the condition of the stream on August 9, 1901.

There is a dam on the main stream at Smith's mill and one on a tributary entering at this point, but neither are in use now for power and have not been for years, as claimed by a local resident. The pond areas of both are practically full of sediment so that the dams can regulate the flow but little.

The Wellsville authorities following the advice of Mr. Kuichling, have placed a weir on the stream just a short distance above the proposed reservoir site and below all important tributaries to this reservoir. The weir is formed of a piece of sheet iron, bedded in masonry laid up with cement, and the rock bottom has been plastered with cement for a short distance above the weir, so that there is practically no leakage. The weir is 18 inches long and depths on it are read from an iron peg set in masonry, in the pool formed by the dam, with the top of the peg level with the crest of the weir. The pool is so large that the velocity of approach for the heads observed is practically nothing. Following are the results of the readings so far as obtained:

Date.	Depth of weir in inches.	Cu. ft. per second.	Gallons per day.
August 1	¾	.0774	50,000
August 2	½	.0422	27,200
August 3	⅜	.0275	17,800
August 4	⅜	.0275	17,800
August 8	½	.0422	27,200
August 9	7/16	.0347	22,400

These gagings show that at times the discharge of the stream is very low, and it seems, much lower than has been allowed for in the table of run-off as prepared above. With a daily average of only 27,080 gallons for six obesrvations over a period of nine days it does not seem probable that the average for the month would be higher than 500,000 gallons per day, the lowest figure given in Table 4.

In determining the amount of water available for the supply of Wellsville it is necessary to take into account the effect of evaporation from the surface of the reservoirs. In this case the total reservoir area considered is 21 acres, the area of the impounding and storage reservoirs. The small area of the high service reservoir is neglected as a factor of safety and to compensate for the smaller area of the impounding reservoir as the latter is drawn down. For times of excessive draft on the impounding reservoir the figures on evaporation may be a little high but the results will not be materially affected, in fact the evaporation in this climate is but a small factor and is usually neglected, but it is included here for the sake of making the report complete.

Table 5 gives the inches of water which evaporated from the surface of ponds, etc. for each month as observed by the U. S. Weather Bureau in 1887-8 at Cleveland and Pittsburg, the nearest station to Wellsville.

Table 6 shows the difference between the rainfall and the evaporation for each month of the years for which the data are available. In wet years the figures for evaporation are too high and in dry years they are too low, so that the result as given is favorable for low flows.

Table 7 gives the difference between evaporation and rainfall, in million gallons, on the two reservoirs.

In Table 8 the monthly run-off has been corrected for the difference between the evaporation and the rainfall on the two reservoirs and gives the amount of water available each month for use in supplying the city. From this table it is readily seen that there is an enormous surplus of water for months of January, February, March, April and December, but that at some time in the eight years given there was a deficiency in May, June, July, August, September, October and November.

In Table 9 there is given the difference between the estimated monthly flow of the stream and the monthly consumption of water in Wellsville, together with the estimated deficiency with the proposed storage capacity of 90,500,000 gallons.

This allows 2,500,000 gallons for the present distributing reservoir, to be used on the high service; 33,000,000 gallons for the storage reservoir, and 55,000,000 gallons for the impounding reservoir, Thirty-three million gallons on the storage reservoir will mean an average depth of 12 feet; if the bottom is irregular above this depth, a deeper draft will be necessary. Fifty-five million gallons on the impounding reservoir is an average depth of 13.4 feet, or a draft of 22 feet as determined from the contours of the reservoir site as given. With a lowering of the water 22 feet in this impounding reservoir, nearly 10 acres of the reservoir bottom will be exposed.

The average daily consumption for the seven months in which there is a question as to the quantity, is taken at 1,500,000 gallons, the present average daily consumption.

In analyzing the results as shown in Table 9 it is seen that in 1900 the daily flow of the stream was sufficient up to September, when there was a deficiency of 44.5 million gallons, then a deficiency of 43.1 million gallons in October, and a deficiency of 1.6 million gallons in November, making for the period a total deficiency of 89.2 million gallons, or 1.3 million gallons less than the storage available. That is, there would be 1.3 million gallons left in the reservoirs at the end of November. In all cases given the monthly flow of December was equal to the season deficiency and the monthly consumption, so if November is passed in safety there would probably be no further trouble. In 1899 the accumulated season deficiency was 115.4 million gallons, or 29.4 million gallons over the proposed storage. In 1898 the shortage over the storage was 4.7 million gallons. In 1897 the shortage was 2.5 million gallons, in October however, instead of in

November, as was the case in 1898 and 1899. In 1896 the shortage was 13.9 million gallons. In 1894 the shortage commenced with 17.4 million gallons in September, increasing to 60.2 in October and finally to the accumulated shortage of 85.4 million gallons in November. In other words, it would have required a storage capacity of 175.9 million gallons in order to tide over the low run-off of 1894. In 1893 there was a November storage of 30.0 million gallons. For the average of eight years there was a shortage of 11.6 million gallons for November, that is for the average season as shown by eight years, the storage capacity should be 102.5 million gallons to supply the present daily consumption of Wellsville as shown by the above analysis. It must be noted that these figures work the reservoir capacity to its extreme limit, something which should not be done in any case.

It is certainly recognized that the above figures are approximate, but it is the only method available in a problem like this and the results must be given some weight. For an accurate forecast of the quantity available from this stream, daily gagings should be made for at least two seasons and a new curve of run-off established for this particular watershed.

At a meeting of the State Board of Health, held August 21, 1901, it was voted to approve the plans for a new public water supply for the city of Wellsville, to be obtained by impounding the waters of Little Yellow Creek, and notice of this action was sent to Mr. Chapin, the Consulting Engineer, August 23, 1901.

REPORT ON THE PROPOSED WATER SUPPLY FOR WOODSFIELD.

At a meeting of the Board held June 26th, 1901, the Secretary presented an application for approval of a public water supply for the village of Woodsfield, and a report on the proposed supply made by Mr. Flynn, the Engineer, which was as follows:

The village of Woodsfield was visited on May 29th, 1901, and the proposed supply investigated. According to the 1900 census, the village has a population of 1801, which is a substantial increase over the figure for 1890.

The desire for a public water supply has been prompted by the scarcity of water during the pervious year, from the failure of many of the private wells, also by the fact that the local oil field has left a great deal of money in Woodsfield.

A franchise has been granted Mr. James Kinney, Jr., of Bellaire, who intends to put in a surface supply as there seems to be no ground water available.

The intention is to use the water of Sunfish Creek at a point north of the village. As the daily flow of this stream is not sufficient for the supply of the village, it is proposed to put in an impounding reservoir on Kerr's Run or the Whittenbrook Run and collect the flow of these streams and supplement it with water from Sunfish Creek, to tide over the low flows of this stream. Sunfish Creek at the site of the proposed intake has a drainage area of 18.3 square miles, as obtained from a map taken from the county atlas. On this district there is an estimated population of 600, or 33 per square mile. The village of Lewisville at the southwest corner of the watershed has a poulation of 170, about half of which is within the Sunfish Creek drainage area. The country drained by this creek is the hilly rolling land of the southwestern part of Ohio, the greater part of which is under cultivation, but much still in timber and pasture, being too rough to cultivate. There are a few oil wells near Lewisville, the drainage from which may at times cause trouble, but which seemingly has no effect as yet.

Of the impounding reservoir sites Kerr's Run has an area of 6.3 square miles and a population of about 10. The B. Z. & C. R. R. runs along the edge of this district and a few roads cross it, giving some chance for pollution.

Whittenbrook Run, at the site of the proposed reservoir, has a drainage area of 1.0 square mile and an estimated population of 20. This district is also traversed by a few country roads and also receives the surface drainage from a small rural cemetery.

On both watersheds there are good sites for storage reservoirs, which with but short dams can give quite large reservoir capacities. Both of the reservoirs and the intake in Sunfish Creek are removed from the drainage of Woodsfield. The intake in the creek can not be moved below the present site, however, as Shoemaker Run, draining a portion of Woodsfield, enters just below the proposed site.

Samples were taken from Sunfish Creek and from Kerr's Run but not from Whittenbrook Run as this stream was not included in the first plan. From inspection, however, the water of Whittenbrook Run should be of better quality than that from Kerr's Run. Rain had fallen on a number of days just preceding the collection of the samples and they represent water stages somewhat above the average.

These samples were referred to the Chemist for examination who reported as follows:

REPORT OF EXAMINATION OF WATER FROM WOODSFIELD.

PARTS PER MILLION.

	Sunfish Creek.	Kerr's Run.
Number of sample	1689	1690
Color	.26	.28
Turbidity	.05	.09
Sediment	slight	slight
Odor	faint	faint
Oxygen required	1.78	1.58
N. as ammonia free	.030	.018
N. as ammonia albuminoid	.094	.088
Nitrogen as nitrates	none	none
Nitrogen as nitrites	trace	trace
Chlorine	1.0	trace
Alkalinity	34.0	26.0
Incrusting constituents	none	none
Total solids	98.	97.
Volatile and combustible	31.	30.
Bacteria per c. c	650.*	1,100.*
Iron	trace	trace

* Colon not found in either sample.

The findings show that these waters are among the best surface waters yet examined by us in the state. Indications of sewage pollution are wanting and in spite of the rain which had fallen in the days just previous to the sampling the waters show quite low results for vegetative matter. Both waters are surprisingly soft for Ohio waters, and attention should be called to the low alkalinity in each case, for that point would need further investigation if filtration with a coagulant were contemplated. If these waters do not become worse than the present samples they would be potable.

The following communication received from Mr. James Kinney, Jr, gives additional information:

WOODSFIELD, OHIO, June 25, 1901.

DR. C. O. PROBST, *Secretary State Board of Health.*

DEAR SIR: — I came out here to-day at noon and this afternoon drove around the watershed of Whittenbrook Run, there being a ridge road on each side of the stream and almost parallel therewith. The old cemetery is on the lower side of the road within the watershed but is surrounded by forest on two sides, a meadow on the third and the road on the fourth. The cemetery is an old one, somewhat overgrown with ivy, ferns, vines and some forest trees. There are marks of eleven graves the newest of which bears date September 29, 1891. Others bear dates back in the seventies, and others are marked with native stone which are moss covered. It is not likely that any further use will be made of it as a burial ground. I am sure no one would be buried there if they could help it. One or more bodies were taken up several years ago. The slope from the cemetery is not steep and is thickly wooded. There certainly can be no danger from this.

The distance from the site of proposed dam is about one mile. At the upper end of the watershed and almost on the divide is a house and some small out-buildings, but no privy. Perhaps we could prevail on them to build one with a cement lined vault and we might build one for them. Two other houses are on the divide, but privies are over and outside our watershed on another branch of the stream, and almost on top of the slope is another house with no privy in sight. A schoolhouse with ground entirely within our watershed, and about a half mile from the proposed dam, has two privies which should be disposed of in some way. Drainage from these grounds could not be diverted. A goodly portion of the drainage from the roads could be diverted at small expense.

The steep slopes on the east side of the run are almost entirely wooded, and on the west side I should think more than one-half are wooded. Nearly all cleared land is in pasture or meadow, generally the latter. One small patch of potatoes, two small patches of corn, and one field of corn, comprise the cultivated lands.

Two barn yards partially drain toward our run, but the same can be easily diverted.

We expect to purchase 12 to 15 acres of ground two-thirds to three-fourths of which will be steep slopes surrounding the water and all these slopes, except a small patch, are covered with timber and undergrowth of bushes.

I think we have a most favorable site for a storage dam and we expect to do everything we can to protect the purity of the water. Please ask your Board not to require us to do too much. We will gladly do anything reasonable without even being asked or required. We want to give Woodsfield pure, clear water, and we think we can do so. The franchise will be assigned to, and the plant will be built by The Woodsfield Water Company.

Very truly yours,
(Signed) JAMES KINNEY, JR.

The Board voted to approve the proposed supply with the proviso that proper measures be taken to protect the supply against dangerous surface pollution. Notice of this action was sent to the Consulting Engineer, Mr. Kinney, July 1, 1901.

SEWERAGE SYSTEMS AND SEWAGE DISPOSAL.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR ASHLAND.

On the part of the village of Ashland, Mr. L. E. Chapin, Consulting Engineer, made application for the approval of a system of sewerage and sewage disposal works, as designed by him. He also furnished the following description of the proposed system and disposal works:

As a part of the application of August 13th, I herewith present plans Numbers 268, 269 and 270, showing the sewerage system, the arrangement of the filtration beds, and the details of the septic tanks proposed for the sanitary sewerage system for Ashland, Ohio. Also make this the following description of the system and the method of disposal contemplated.

Plat No. 268, by the contour lines shown thereon, shows the general elevation of the village and adjoining lands as referred to the village base. Also the location and sizes of the sewers proposed, and the location proposed for the disposal works.

The system shown comprises some 17 miles of sewers, and is designed to cover the built up portions of the village as well as some portions not yet built upon, but which are necessarily to be sewered, to provide an outlet for sewers in the built up parts of the village.

All these lines have been designed for a minimum depth of cutting of 8 feet, that being necessary to provide for fixtures in basements. The main sewer in Cleveland street, and Rowsburg road, has its outlet as herein proposed on the Findlay farm east of the village limits, and is 15 inches in diameter.

All lateral sewers are to be provided with automatic flushing basins, or flushing man-holes at their upper ends, and man-holes provided at all changes of grade and allignment.

This being expressly a sanitary system, no storm or roof water is to be admitted.

The amount of sewage to be carried for some time is estimated to be not over 200,000 gallons per day, the present pumping rate from the water works plant for domestic and manufacturing purposes and sprinkling, not exceeding this amount.

The land selected for the disposal works is one of the various parcels available from the elevations of its surface and the character of its surface soil. It is proposed to purchase this farm or some other equally suitable tract of about twenty acres in area, and carry the sewage thereto by gravity and dispose of it by filtration on prepared filter beds, first removing a portion of the suspended matter by passing the sewage through septic tanks, three in number, and each being 10 feet wide and 32 feet long, and having an average depth of 5 feet at the flow line of the tanks.

The entering sewage first passes into a sand chamber in which the heavier matters are precipitated, and then into the septic tanks by a trapped opening, then passing through the tanks and leaving at the far end also by trapped opening 8 inches in diameter, and thence onto the various filter beds by surface carriers in earthen ditches.

Valves and piping are provided that any tank may be freed from the contents and cleaned when the conditions so require, without shutting off the flow of sewage from the other two tanks.

The liquid and sludge from these tanks when cleaned, is to be run over the surface of filter bed No. 1, and the liquid disposed of by filtration, and the dried sludge to be removed and surfaced over the high land and ploughed in. Also, if found desirable in operation, the thick sludge is to be discharged from the drainage pipe at the end of the tanks into wagons and carted to the lands and ploughed in; the grades of these outlet pipes so permitting without lifting the sludge.

Provision is to be made for housing the tanks should it be found necessary in operation to avoid odors.

These tanks are to be constructed of brick laid up in Portland cement mortar, and the inner surfaces treated with a cement wash to insure clean and impervious surfaces.

When the tanks are cleaned it is proposed to wash thoroughly the sewage exposed surfaces to prevent unnecessary odors, using lime for this wash solution.

The filter beds are six in number, having effective areas as follows:

Tank No. 1, .69 acres; No. 2, 1.04 acres; No. 3, .72 acres; No. 4, .83 acres; No. 5, 1.03 acres, and No 6, .83 acres; a total of 5.14 acres.

Each filter bed is to be surrounded by an earth embankment of the widths shown and two feet in height above the surface of the beds, excepting along the creek, where the embankment will be carried up to a height sufficient to shut off the high water of the creek during the short times when the creek is in flood.

Nine test pits have been opened to a depth of from 5 to 10 feet, showing a formation of, generally, 2 feet of sandy loam and clay, then from 2 to 5 feet of sand and gravel, then varying layers of sand and clay to the deeper excavations.

It is proposed to remove the vegetative matter from the surface of each proposed bed, using the earth so removed to make the embankments about the beds, and to underdrain all the beds with parallel lines of 3 and 4-inch tiling laid from 3 to 5 feet below the surface, and discharging into a breast pipe laid under the embankment along the creek with an outlet of cast iron pipe at the lower end near the road bridge shown on the plat No. 269, man-holes being placed on this breast pipe for inspection of the effluent attained.

These tile trenches are to be filled with gravel to a height of 2 feet, and the balance of the trench back-filled with the material forming the surface of the beds.

To form the surface of the beds it is proposed to excavate the sandy clay soil from the portion of the farm along the side hill, and use the sand and gravel therefrom for the filling of the beds, then finish with the finer materials from near the surface, giving so far as possible a material fine on the surface and coarser in the bottom of the fills. The lower parts of beds numbers 2, 4 and 6, to be filled, the balance of the beds and the upper ends of these mentioned being gravel and sandy soil, and above the elevation of high water in the stream.

By removing the larger part of the suspended matter in the septic tanks, it is believed that the beds so prepared will have a dry weather capacity of 40,000 gallons per acre, and during wet weather, should the beds become overloaded, it is proposed to divert a portion of the sewage across the creek, and temporarily dispose of it by broad irrigation on the lands below the level of the disposal sewer.

The portion of the farm across the creek being reserved for filter beds to be similarly prepared when the amount of sewage requires its use. The flow of sewage to the beds is to be controlled by dams of earth and sod placed across the carrier trenches as desired, and all beds so graded as to give as nearly as possible a uniform distribution of the sewage over the entire surface of each bed.

The cost of constructing the septic tanks and preparing the filter beds, and building the disposal sewer from the highway is approximately $5,000, without the cost of the land and fencing.

This area so lies that should the growth of the village require the construction of sewers in the north part beyond the territory embraced in the present sewerage system, such sewage may be carried to this land, or to other sites by gravity.

The care of the disposal grounds, and the maintenance of the sewers are to be placed under the charge of an enploye of the village, who is to give his entire time to such works and sewers.

The plans were presented to the Board at a meeting held August 21, 1901, and it was voted to approve the plans for a sewerage system and disposal works. Notice of this action was sent to the Consulting Engineer, Mr. Chapin, August 23, 1901

REPORT ON SEWERAGE AND SEWAGE PURIFICATION FOR CELINA.

Plans for a system of sewerage with sewage purification works for the village of Celina were presented by the Consulting Engineer, Mr. J. P. Force. The plans were accompanied by the following descriptive report:

Celina, the county seat of Mercer county, is situated on the northwest bank of Mercer county reservoir, and has a population according to the Federal Census of 1900, of 2,815.

The village has an excellent system of water works, the source of supply being deep wells. The consumption of water varies from 60,000 gallons per diem in the fall, to 300,000 gallons in the summer, the former figures probably approximating the water used for household and boiler purposes.

The general contour of the surface of the village is quite flat, the center of the village being only eight feet above the present elevation of water in the reservoir, and the southern portion being from two to three feet below the water level.

The drainage of the village is effected mainly by several ditches discharging into Beaver Creek, which empties into the Wabash River nine miles west of the village at a point two and one-half miles from the Indiana and Ohio state line.

At present there are several so-called storm water sewers discharging into Beaver Creek, which convey the sewage from the court house, jail, city hall, hotels, buisness blocks, and private residences.

Beaver Creek is little more than an ordinary open ditch, with very little fall. The flow is extremely sluggish and during the dry season composed entirely of crude sewage. Sewage sludge is deposited on the bottom of the creek near the village, to a depth of from four to six inches.

The village council desires to ameliorate this condition of affairs by introducing a system of sewerage and sewage purification.

I have been retained to prepare plans, etc., for a complete system of separate sanitary sewers, sewage purification works, and storm water drainage.

The authorities propose to hold an election for the purpose of voting on sewerage as soon as possible after the approval of plans by your honorable body. I accordingly present plans herewith, and ask for them your favorable consideration.

The system of sewerage proposed is the separate or sanitary system for sewage alone.

The sewers to be of first quality vitrified sewer pipe, with cemented joints, laid with sufficient fall to insure a cleansing velocity and provided with manholes at frequent intervals, and automatic flush tanks at the head of all lateral sewers.

Sub-drains will be laid beneath the sewers for the removal of subsoil water.

Storm water will be provided for by the construction of separate storm water drains, discharging into ditches, and into Beaver Creek.

The complete plan of sanitary sewers comprises about ten miles, but it is hardly likely that more than half of that length will be constructed at present.

SEWAGE PURIFICATION.

The purification of the sewage of Celina would present a difficult problem, and an expensive undertaking were it not for the light shed in recent years upon the septic and bacterial processes.

The soil at Celina is wholly unsuitable for a land treatment of sewage.

There is no sand in the vicinity that could be utilized without enormous expense, for intermittent filtration.

The difference in elevation between the water level in the creek, and a main sewer laid at a reasonable depth is too small for deep filters.

Any proposition for sewage purification including the use of chemicals, or the expense of pumping, would defer the introduction of adequate sewerage works indefinitely.

Under these circumstances, a combination treatment consisting of the septic process, followed by bacterial oxidation in contact beds is naturally suggested as the only alternative to the present decidedly unsanitary condition.

I have accordingly arranged a system of sewage purification on these lines, following the best practice regarding arrangement of septic tanks and contact beds.

The septic tanks shown on the plan accompanying this report are each designed to afford a twelve hour treatment to 50,000 gallons of sewage daily.

In this way the works, which are designed for a population of three thousand inhabitants, are divided into six units equivalent to five hundred inhabitants each.

The removal of sludge from the tanks when necessary, will be effected by an odorless excavating pump, with a flexible suction hose, which will remove the sludge from the bottom of the tanks without interfering with the regular flow in the tank. The sludge will be pumped into a tank on wheels and removed to a suitable place of deposit and applied to the soil.

The contact beds are to be composed of crushed coke laid to a depth of three feet, with a three inch layer of gravel on the surface, and thoroughly underdrained. The beds are arranged in series of three, for convenience in operating. Each series being of sufficient area and cubical content to affect the purification of 50,000 gallons of septic effluent daily, at the rate of 400,000 gallons per acre.

At this rate, per cubic yard of material, the Lawrence, Massachusetts filter No. 103, combined with the septic treatment, shows a total average removal of organic matter in 1899 of 82 per cent of free ammonia, and 89 percent of albuminoid ammonia.

The effluent from the contact beds is to be discharged into a storm water sewer laid to Beaver Creek.

There is no town or village situated on Beaver Creek west of Celina and the waters of the creek are not used for domestic purposes.

It is therefore believed that a removal of organic matter to the extent indicated by the Lawrence experiments will prove amply sufficient to satisfactorily improve the present filthy condition of the waters of the creek.

OPERATION OF WORKS.

As the works for Celina are designed to operate automatically in the same manner and with the same kind of appliances as planned for Delaware, (the plans having been approved by your honorable body), I will insert here a description of the operation of the works taken from the Delaware report for your further information.

"The sewage after passing through the septic tanks will flow from the main pipe through a branch feeder to one or more of the sets of three beds. This pipe is constructed for a short distance in the form of an inverted siphon, discharging and rising vertically in the center of a brick chamber—this pipe will terminate in a brass ball and socket joint, to the upper flange of the movable part of which is attached the distributor. This distributor is formed into three channels radiating from a common center, the channels themselves formed of galvanized iron are pitched to an angle above the horizontal so that when one is level in position to discharge the other two are elevated. These movable channels connect, when in a position to discharge, with inverts in the bottom of the masonry chamber, which in turn connect with discharge pipes to the surface of the coke beds. From each coke bed a line of 1½ inch pipe is laid to a separate compartment in the chamber, and in each compartment is a float connected with the movable distributor. The operation of this device is as follows: The movable distributor is placed in position to discharge into the channel leading to bed No. 16, and the septic sewage rising in the discharging end of the inverted siphon will flow through the channel and pipe to bed No. 16. When the sewage rises to a point just beneath the surface of the bed sufficient will flow through the pipe leading to the float compartment to fill it and raise the float, which will in rising turn the distributor so that the discharge will be switched to bed No. 17. This will take place as each bed fills, so that each one will receive just sufficient to fill it in turn no matter how irregular the flow of sewage may be.

The emptying device is also automatic in character.

The main underdrain from each bed will lead into a brick chamber containing a siphon provided with an air valve. As the sewage rises in the bed the air will be compressed in the descending limb of the siphon, but the siphon will not discharge when the bed is filled until the compressed air is released.

Each bed will stand full in turn until the sewage rises to a certain point in the next one, when sewage will flow through a small pipe to a float chamber, and lifting the float will open the air valve and start the siphon in operation, which will empty the bed.

The time of standing for each bed is capable of perfect adjustment."

PRESENT INSTALLATION.

The general plan presented provides for the disposal of 300,000 gallons of sewage daily or for a population of three thousand at the rate of 100 gallons of sewage per capita, daily.

It is proposed, however, to construct at present only one-third of the general plan or a system of two septic tanks and six contact beds which will provide for the disposal of 100,000 gallons of sewage daily: Additions to be made to the works from time to time as the flow increases.

The proposed installation will be no doubt amply sufficient for a number of years to come.

The daily pumpage at the water works being at present only 60,000 gallons per day when street sprinkling is not practiced.

LOCATION OF WORKS.

The proposed location of the works as shown on the location plan accompanying this report is south of the Lake Erie and Western Railway and east of the extension of Sugar Street. The land at present is used for farming. The nearest dwelling is situated, as shown on the plan, 825 feet northwest of the proposed location.

The land south of the site selected is low, and subject to overflow at times when the reservoir discharges over the spill-way, and is therefore not available for building sites.

I respectfully submit the plans for the proposed sewage purification works and the foregoing report and ask for the council of Celina, the approval of the same as follows:

First. The approval of the plan as presented subject to such restrictions as to the operation of the works as you may deem necessary, or, Second. The approval of the plan as presented, with a clause specifying that the septic tanks must be covered if they prove offensive, or,

Third. The approval of the plan as presented with the proviso that the septic tanks must be covered when constructed.

The engineer of the Board, Mr. Benj. H. Flynn, was instructed to visit Celina and report upon the proposed plans. Mr. Flynn reported as follows:

Celina is a small town with some 2815 inhabitants, situated just north of the Grand Reservoir, and on the head waters of the Wabash River. The town site is quite level with parts of it poorly drained, but the greater portion draining fairly well to small ditches, tributaries of a large ditch known as Beaver Creek, a branch of the Wabash River. These ditches, together with Beaver Creek, have very low gradients and except in time of and for a short time after rains, the water in the ditches seems to have absolutely no flow. It is claimed that Beaver Creek has the same low gradient to its confluence with the Wabash River, nine miles away.

There are a few short private sewers in use in the village with outlets to one of the above ditches. It is claimed that there are some ten water-closets in use and most of their drainage reaches this ditch. At the time of inspection the ditch contained considerable sewage, especially large amounts of wash water, and it was causing a very objectionable nuisance. Owing to the lack of current the sewage had deposited its solid matter along the ditch, filling it with a very offensive black sludge. This black deposit was present in the ditch for a considerable distance from the town, but there was no particular nuisance except in the vicinity of the sewer outlets and immediately below. The lack of current and the large amount of weeds and brush prevented the sewage from traveling far at the present stage.

The preliminary survey showed that a gravity system can be secured with four feet at the outlet for the disposal works. It is evident from the description of the stream, as given above, in which the effluent must be turned. that a rather high degree of purification must be obtained in order to prevent a continuance of the present nuisance.

The village has a public water supply which is in extensive use for domestic purposes, and it only needs a sewer system to bring about a general use of this water for all purposes. The daily consumption in the winter and spring is from 60,000 to 100,000 gallons, while in the summer the consumption reaches 300,000 gallons per day. Much of this latter, however, is used for sprinkling and would never reach the sewers. A disposal plant with a present capacity of say 250,000 gallons would no doubt be ample for some time with the present rate of growth. It should be able to handle a much less amount as a new system will not receive the entire amount of waste at once.

The Board voted to approve the plans, subject to the following conditions, to-wit: That if at any time it should become necessary, in the opinion of the Board, to provide for a higher degree of purification of the sewage than will be effected by the proposed purification plant, in order to prevent the creation of a nuisance, such additions to said plant shall be made as may be required to purify the sewage to a degree satisfactory to the State Board of Health.

Notice of this action was sent to the Consulting Engineer, Mr. J. P. Force, August 23rd, 1901.

REPORT ON THE SEWERAGE AND SEWAGE DISPOSAL FOR COLUMBUS.

On October 31, 1900, the Board of Sewer Commissioners of the city of Columbus presented plans and specifications for an extension to the sewerage system of said city and for sewage disposal works, which they asked to have approved by the Board.

As regards purification works the proposal was in brief, to introduce septic tanks and to discharge their product into the Scioto River without further treatment.

Accompanying the plans was an argument, prepared by the Engineer of the Commission, Mr. Julian Griggs, which was in part as follows:

The Columbus Sewer Commissioners hereby request your honorable body to approve a plan of sewage disposal for the city of Columbus, by a twelve-hour treatment, by the septic tank process in twenty concrete tanks of 500,000 gallons capacity each, by which a purification of about fifty per cent. is expected, as measured by reduction in albuminoid ammonia or oxygen consumed. They present herewith reasons why, in the opinion of said commissioners, the purification proposed should be considered sufficient.

Pawtucket, Rhode Island (36,000 population) has about 12,000 of its people served by a sewerage system, and disposal works of intermittent sand filtration built some years ago; to store the night flow they had two shallow tanks covered with wooden roofs, the disposal works being not more than six feet from the main street of the city, with its trolley line and a good class of dwelling and business houses.

The capacity of these tanks is 66,000 gallons each, and the daily flow of sewage is given as 130,000 gallons, increasing when it rains.

The use of these tanks for the septic process began January 13th, 1900, and has been continued to the present time. The effluent being filtered on the sand beds for a further purification.

Since the bacterial action in the tanks came to be established, the Rhode Island State Board of Health, by its chemist, Mr. Ernest T. Badger, has been making weekly analyses of the raw sewage and septic effluent, and has found from the average of ten analyses a purification as measured by a reduction in albuminoid ammonia, 48.95 percent; reduction in oxygen consumed, 54.4 percent.

The maximum reduction for the period by albuminoid ammonia is 60.1 percent, by oxygen consumed is 67.7 percent. The minimum reduction for the period by albuminoid ammonia is 31 percent, by oxygen consumed, 35.7 percent. The minimum reduction was obtained the first week observations were made. The leathery scum as observed by the Sewer Commissioners, in August, 1900, was about three inches in thickness; the sediment from the tank was only near the inlet which was untrapped. There were no offensive odors connected with the operation of the works.

At Worcester, Massachusetts, one of their chemical tanks, 162 2-3x40x7 feet has been used now for more than a year as a septic tank for the treatment of a million gallons of crude sewage per day which reduces to an eight hour period; the analyses indicating about a 50 percent purification by the process. The septic effluent is being treated intermittently on sand at the rate of 500,000 gallons per acre, per day.

It may be remarked that at these works, which are perhaps the most intelligently managed in the world, about seventeen million gallons of sewage per day, are treated by the lime process and a high degree of purification effected for this method at an expense of about thirty-five cents per capita, for a population of 125,000 people.

The degree of purification obtained is shown in the table below from the report of Mr. Harrison P. Eddy, Superintendent of Sewers.

PERCENT OF ORGANIC MATTER REMOVED FROM SEWAGE AT WORCESTER, MASSACHUSETTS, BY CHEMICAL PRECIPITATION.

Date.	Total amount by albuminoid ammonia.	Total amount by oxygen consumed.
1893	48.49%	33.65%
1894	50.79%	43.84%
1895	61.53%	54.35%
1896	53.92%	51.62%
1897	53.42%	52.00%
1898	....	....

It is worthy of note, how very little greater is the purification effected by this expensive treatment than is now being accomplished by means of the septic tanks.

Other comparisons and contrasts are of interest at this point. The Blackstone River which receives the effluent from the Worcester disposal works has for its total drainage area in Massachusetts, 260 square miles, as against 1560 square miles for the Scioto and its tributaries above the proposed Columbus disposal works. The valley of the Blackstone River is a succession of populous villages, from Worcester to Providence, a distance of forty-three miles. Below is a list of cities and villages, given in geographical order, with population as shown by a Rand & McNally's pocket map, the first being Millbury, less than three miles below the disposal works:

Miles from Worcester.	Name.	Population.
5	Millbury	26,000
8	Wilkinsonville	
9	Saundersville	550
10	Farnumsville	50
11	Rockdale	200
12	Northbridge	4,603
	Riverdale	
	Centerville	370
	Uxbridge	1,125
13	Millville	2,400
25	Blackstone	3,200
27	Woonsocket	20,830
30	Manville	2,200
32	Albion	900
34	Ashton	925
	Berleley	
36	Lonsdale	1,225
37	Valley Falls	2,000
	Central Falls	4,650
39	Pawtucket	27,633
43	Providence	132,146

It is known that the waters of the Blackstone are used for manufacturing purposes, and that the waters in the river have prevented the making of certain delicate fabrics; when we consider that the Scioto River below Columbus is used for neither manufacturing nor water supply purposes, that there are no populous villages on its banks until Circleville is reached, with 7,000 people, thirty miles away; with hardly a house standing as near as one-half mile from the river bank in that distance, and that the waters of the Scioto by natural oxidation reach a state of comparative purity in less than thirty miles, as shown by the chemical survey of the river by your Board, in 1897, it seems reasonable that a purification of Columbus sewage which would remove from forty to fifty percent of organic matter and reduce the remainder to a condition more easily oxidized should for the present and until conditions are materially changed be considered an abundant provision.

The relative proportion of evils and benefits also should not be lost sight of; it is of vastly more importance that the citizens of Columbus be supplied with pure drinking water throughout the year, than that a small portion of the rural population below Columbus be relieved from the occasional offense of a musty odor from the river.

The reasons why the septic tank process as herein proposed should be approved may be briefly summarized as follows:

1. It has been proved a scientific method of sewage disposal, accomplished by the aid of bacteria, possibly assisted by chemical compounds, known as enzymes.

2. It has been shown equal in all respects, and at times superior to the well known and well tried method of chemical precipitation.

3. Chemical precipitation has been found a thoroughly satisfactory method of disposal under certain conditions, as witness the sewage disposal works at Canton and Alliance in this State.

4. If conditions were made to order they could hardly ever be found more favorable to a partial process than at Columbus, due to the opportunity for dilution in a river of considerable size. The non-use of the river below Columbus for manufacturing and water supply purposes, the comparatively short distance within which purification is now effected by natural processes, and the absence of a large population living upon the banks of the river below the disposal works to be injuriously affected by a method of disposal less than perfect.

There has been omitted from the above argument statements as to the work with septic tanks at Exeter, Manchester and Leeds, England, and at Champaign, Illinois.

The matter was referred to a special committee, consisting of Drs. Warner, Crossland and Probst, for investigation and report. At a meeting of the Board held January 16, 1901, the committee presented the following report:

The committee to which was referred the plans for an extension of the sewerage system, and sewage purification works for the city of Columbus, would respectfully report as follows:

The proposition submitted to the Board for approval was as follows: "The Columbus Sewer Commissioners hereby request your Honorable Body to approve a plan of sewage disposal for the city of Columbus, by a twelve-hour treatment, by the septic tank process in twenty concrete tanks of 500,000 gallons capacity each, by which a purification of about fifty percent is expected, as measured by reduction in albuminoid ammonia or oxygen consumed."

The committee met at the office of the Secretary on November 7, 1900. Prof. C. N. Brown, member of the Columbus Sewer Commission, and Mr. Julian Griggs, City Engineer, were present by invitation, and the plans, as submitted to the Board for approval, were discussed.

The committee decided that it would be advisable to make a personal inspection of several sewage disposal plants in the east, and especially to visit certain places where experimental work in the treatment of sewage by septic tanks is being carried on. The sanction of the Board having been obtained, your committee started east on December 16, 1900. Going by way of Albany, N. Y., the committee stopped there long enough to examine the new water purification plant. We would simply say in passing that we were greatly pleased with this plant, which seems to be giving perfect satisfaction, and which has already lowered the death rate from typhoid fever in Albany.

At Albany we met Mr. Olin H. Landreth, Consulting Engineer of the New York State Board of Health. He said he was working up the claims of certain persons who state that they hold patents covering the septic treatment of sewage. He thought it would scarcely be safe to introduce this system on a large scale without first ascertaining the exact status of such claims. There would seem to be two claimants; one an American company, the other an English company. The latter has the name of Mr. Cameron, of Exeter, England, where the first working plant was installed, associated with it. We heard more of these claims in Boston. Your committee did not pursue the subject further. It would doubtless be worth looking into.

At Worcester the committee were met by Prof. L. P. Kinnicutt, of the Worcester Technique Institute, to whom we are indebted for many courtesies and every possible assistance in our investigation. Prof. Kinnicutt has charge of the laboratory work that is being carried on to determine the results of sewage purification at Worcester.

For considerably more than a year Worcester has been operating a septic tank which is an old chemical precipitation tank of about a million gallons capacity. They have also a small closed septic tank which Prof. Kinnicutt is using chiefly to study the character of gases formed in septic tanks.

As the Board will recall, Worcester has for many years partially purified its sewage by chemical precipitation. This did not give sufficient purification to abate a nuisance in the Blackstone River into which the effluent is discharged. Prolonged litigation against the city led to an order from the court for Worcester to further purify its sewage. Sand filter beds have been constructed for this purpose; but Worcester has been trying to decide whether it would be better to replace chemical precipitation by septic tanks for the preliminary treatment which will be necessary.

The open septic tank in use here was quite foul, and the source of bad odors. The effluent from this tank was still more offensive. This odor was removed after filtering the effluent through sand, and the effluent did not undergo further putrefaction on standing. The average removal of organic matters by the septic tanks, as measured by the reduction in albuminoid ammonia, according to Prof. Kinnicutt, was 36 percent for the open tank, and 37 percent for the closed tank. This is less than that reported at other experimental plants of this kind. Mr. Eddy, who is in charge of the sewage disposal works of Worcester, said that the septic tank was often a serious nuisance, noticeable quite a distance from the works. When asked whether, in his judgment, open septic tanks for Columbus, to hold 10,000,000 gallons of sewage would cause a nuisance liable to annoy people in their vicinity he said, "Probably the people of Boston would not object but I am sure the people of New York would."

Prof. Kinnicutt also testified to the tank at Worcester often being a nuisance. An interesting fact was reported here which should be recorded. It was first thought that perfectly tight tanks were necessary for septic treatment of sewage. Later it was found that open tanks would answer, and it was suggested that the thick scum that forms on the surface in open tanks acts as a necessary cover. There was a thick scum on the Worcester tank in September, 1900, when a violent windstorm blew it entirely away. This has never re-formed, and yet septic action has gone on with the same efficiency as when the scum was present.

The committee next visited Boston and consulted with Dr. Walcott, President of the Massachusetts State Board of Health, Mr. Goodnough, Chief Engineer of that Board, and Mr. Clark, Chemist of the Board. Mr. Goodnough said that one would be surprised to see the quite excellent results in sewage purification obtainable on land that appeared to be not very suitable for that purpose.

The committee then visited the Lawrence Experiment Station of the Massachusetts State Board of Health, and the sewage disposal works at Andover, which is nearby. We were fortunate enough to have Mr. Clark, who is in charge of the Lawrence station, with us at both places.

The members of the Board are familiar with the Lawrence station, to which the entire world is an acknowledged debtor for their invaluable studies of methods for purifying water and sewage. A tumbled-down building, containing, however, an excellent laboratory and expert workers, and a lot of small, cheap wooden and metal tanks filled with various filtering media, comprise all the outfit, but what far-reaching results from the application of the truths unveiled there! A visit to Lawrence is to have enforced upon you the homely adage, "Be sure you are right, *then* go ahead."

We were able to see sewage purified in various ways, and filtered through various kinds and sizes of filtering material. Septic tank effluent was invariably a foul smelling liquid.

Andover, Massachusetts, introduced a sewerage system and sand filters for purification in 1898. As yet the flow of sewage is small and it is also a very strong, concentrated sewage. They installed a small, closed septic tank and a sand and coke filter near the disposal fields in July, 1899, for experimental purposes. The sewage is quite stale by the time it reaches the septic tank. The effluent from this tank was exceedingly foul and stinking. A curious, and most interesting fact is that it has been impossible to purify this effluent by filtering it through coke filters. During warm weather there was slight purification of the effluent from the septic tank that was passed through the sand filter, but this purification stopped in November. No purification (no nitrification) whatever took place in the septic tank effluent passed through the coke filter. That is to say, the attempt to purify sewage by septic tanks and coke beds was a complete failure at Andover for more than a year. Just a few weeks prior to our visit nitrification had slightly begun. Mr. Clark said he could offer no explanation of this remarkable failure to purify the septic tank effluent.

This is a forcible example of the fact that there remains much to be learned about the septic treatment of sewage.

The committee next visited the sewage disposal works at Providence, R. I., and at Pawtucket, which is quite near Providence. We had the good fortune to have Dr. Swarts, Secretary of the Rhode Island State Board of Health, and Mr. Badger, Chemist to the Board, with us at both places; while at Pawtucket, Mr. Carpenter, the City Engineer, and at Providence, Mr. Clapp, the City Engineer of that place, accompanied us. We are indebted to all of these gentlemen for many courtesies, and much information, as they had been making extended studies of the septic treatment of sewage.

Pawtucket has been purifying about one-fourth of its sewage by intermittent filtration for several years. For one year this sewage (now about 170,000 gallons a day) has been first subjected to septic tank action. Dr. Swarts said that during the first six months they thought the septic tank was going to solve the problem, but since then they were somewhat in doubt about it. The doubt expressed was in part due to the peculiar action of the septic tank. The tank, which is shallow, nearly filled up, not with sediment at the bottom of the tank, as usually found, but with the top scum, which became 2½ feet thick in places. This of course greatly lessened the capacity of the tank, and proportionately shortened the time the sewage remained in the tank in passing through it. This is another very curious and unexplained phenomenon in connection with septic tank treatment of sewage not to be lost sight of. The tank, a small one, holding 66,000 gallons, has been cleaned once already and 1,863 cubic yards of sludge removed. The average reduction of impurities of the sewage by the septic tank has been 41.5 percent.

There was no marked odor about the septic tank itself, when we saw it, but the effluent had a very foul odor.

It should be stated that the sewage of Pawtucket is very concentrated, stronger than that at Exeter, England, or at Andover, Massachusetts, and about three times as strong as average sewage of American cities.

Providence has just completed a plant for purifying their sewage by chemical precipitation. The plant was chiefly of interest to us as being somewhat near the size of the one Columbus is proposing to build. The chemical tanks are similar in construction to the septic tanks proposed, though Columbus would have to have more of them. The large pumping plant at Providence, constructed to pump 30,000,000 gallons of sewage a day, is much like Columbus proposes to have to handle 40,000,000 gallons of sewage and water during high water in the river.

Returning via New York, the committee consulted several well known authorities on sewage and water purification.

The committee has also investigated two sewage purification plants in Ohio where septic tanks are in use: One at the Trumbull County Infirmary, near Warren, and the other at the Fairmount Children's Home, near Alliance. The former has been operated about 18 months, and the latter about six or eight months. Both are small plants, but larger than some of the experimental plants visited.

The Trumbull County Infirmary plant has given satisfaction. The tank is closed. There is some annoyance from bad odors when it is emptied upon the coke filter beds.

The plant at the Fairmount Children's Home has not given satisfaction. The tank is closed, but the stench when its contents were run upon the filter beds was so great that the use of the plant has been abandoned pending changes which it is hoped will remedy the trouble.

It is possible that the difficulty here is caused by the tank being too large. For this reason the sewage remains in the tank from 36 to 48 hours, and becomes exceedingly foul.

The committee also visited the location of the septic tanks proposed for Columbus, and examined the lands adjoining.

The committee's conclusions and recommendations are as follows:

1. Nuisance from the septic tanks themselves.

It was at Worcester only that great complaint was made of nuisance from the tanks themselves. This nuisance may be due to the character of Worcester sewage, though it should be borne in mind that Worcester was the only place where a large quantity—a million gallons—of sewage was being held in a septic tank. The committee would hesitate to predict whether 10,000,000 gallons of Columbus sewage in open septic tanks, as proposed, would or would not cause a local nuisance.

In considering this question it should be taken into account that the prevailing winds would be from the proposed location of the tanks towards the city. In this connection we quote a paragraph from the report presented to the Board by the Columbus Sewer Commissioners, which they in turn quote from the Annual Report of the Massachusetts State Board of Health for 1898. It is there said: "Of course, with an air-tight tank the gases can be prevented from escaping into the air until just before running into the sewage filters, and at that time they can be taken care of, and thus prevented, perhaps, from making the tank and its surroundings a nuisance."

2. Nuisance from pollution of the river by the effluent from septic tanks.

It appears that this effluent is in condition to rapidly undergo further decomposition, so that, if a nuisance should be created it would be near the point of discharge of such effluent. With either raw sewage, or sewage treated chemically, the nuisance, if any would be much farther down stream.

The question of stream nuisance from sewage depends chiefly upon the proportion, in quantity, the sewage discharged has to the flow in the river receiving it. The character of the sewage, i. e., amount of decomposable organic matter it contains, and the character of the stream, viz., velocity, etc., also enter into the question.

The disposal of sewage by dilution is discussed by Mr. Alvord, who, as consulting engineer, reported upon sewage disposal for Columbus in 1898. He estimated that during a dry season, when the Scioto River is shallow and sluggish, there should be a dilution ratio of 7 cu. ft. per second per 1,000 persons; and he shows that upon this basis there was a period of three months in 1897 during which the river at Columbus could have disposed of the sewage by dilution of only 4,430 persons.

It is of interest here to note the recommendations recently made to the city of Waterbury, Connecticut, on the subject of sewage disposal by Mr. Rudolph Hering, consulting engineer. He advises that the sewage be turned into the river without treatment at times when the river's flow equals 7 cu. ft. per second for each 1,000 inhabitants. It seems quite probable that the sewage of Columbus, during a part of each year, when the river is not too low, could be discharged directly into the river without creating a nuisance.

The Sewer Commissioners of Columbus, in their report to the Board say: "It seems reasonable that a purification of Columbus sewage which would remove from forty to fifty per cent. of organic matter, and reduce the remainder to a condition more easily oxidized, should, for the present, and until conditions are materially changed, be considered an abundant provision."

We are not sure that it should be assumed that a reduction of 50 per cent. of the organic matters in raw sewage by septic treatment would reduce the liability to nuisance from bad odors in the river in the same proportion. Admitting this, however, it would seem clear, from Mr. Alvord's figures, above quoted, that even fifty per cent. purification, the very utmost to be expected from septic treatment, will not abate the nuisance in the river in times of low water. If the river during three months was capable of purifying the sewage of but 4,430 persons, it is not to be expected that the sewage of more than 125,000 persons, the present population of Columbus, can be safely turned into the river, after removing but one-half of its impurities.

It was freely admitted by the commissioners, when they appeared before the Board, that it would be necessary to purify the effluent from the septic tanks. They estimated that to install coke filters for this purpose would cost fully $600,000. It is still uncertain what the life of such filters would be. No one, probably, would recommend their introduction at this time. From the best information obtainable, there seems to be only a comparatively small quantity of land suitable for purifying the tank effluent that can be reached from the location proposed for the septic tanks, so that a considerable area of artificial filters will have to be provided. How large, or at what cost, has not, we believe, been determined. It is urged that septic tanks be introduced now, and that the question of how the effluent shall be purified be determined afterwards. Your committee is firmly of the belief that it would be most injudicious to make such a large expenditure without a considerable further study of Columbus sewage, and the best manner to purify it. The only figures presented so far show that to install the septic tank treatment with beds for purification of the effluent, which will undoubtedly be required, will cost in the neighborhood of a million of dollars.

There are doubtless many objections to be urged against an experimental plant, should such a plant be found necessary to determine the best and most economical method to purify the sewage of Columbus. Most unfortunately the question of issuing bonds for a sewage disposal plant is tied to the question of constructing sanitary sewers for the West Side. There is a great need for the early relief of this district. An experimental plant would mean delay. In the face of this we would urge a further consideration of the subject of disposal. The cost of an experimental plant would not be large. Such plants have nearly always been the means of saving money by showing certain proposed expenditures to be unnecessary, both as regards construction and operation. Engineers in planning large works of this kind upon insufficient data must provide a large margin of safety. Exact information will often reduce or make entirely unnecessary the sum provided for this "margin of safety" Columbus, fortunately, is not bound to any one system of sewage purification. Seven different ways of doing it have already been reported upon. We would simply urge that more time and study is required to certainly select the best one.

The scientific study of the septic treatment of sewage is of recent date. Much remains to be learned. We have shown what varying results, still unexplained, have been noted in different places where its use is being studied. No city in the world as large, or nearly as large as Columbus, has yet tried it.

While many facts in regard to it have been learned during the past two years, we nevertheless believe that the recommendation of Mr. Alvord, given in the report above referred to, is yet a good one, viz: "The septic system, as we have before indicated, is of great interest and unquestioned merit, but we would not at this time feel warranted in recommending its use on so large a scale without great caution, and as it does not appear to be of such low cost as to warrant further consideration, we would set it aside for the purpose of this report."

The objections to the plan proposed may be summed up as follows:

1. The possibility that open septic tanks for 10,000,000 gallons of sewage will of themselves create a nuisance.

2. The certainty that septic tanks alone will not prevent pollution of the river, in low water, nor remove the nuisance, the chief object for introducing sewage purification works.

3. The excessive cost of artificial filters that will be required to purify the septic tank effluent, and the uncertainty with regard to the life of such filters.

4. The lack of exact, scientific knowledge of the septic tank process under varying conditions (i. e., with sewage of different compositions) and the possibility that this process on a large scale may not prove to be of permanent value.

Your committee would therefore recommend that the plans to purify the sewage of the city of Columbus by the so-called septic tank treatment be disapproved.

The Board voted to adopt the report of the committee and its recommendations disapproving the proposed plan for disposing of the sewage of Columbus, and notice to that effect was sent to the engineer, Mr. Julian Griggs, January 29th, 1901.

The Columbus Sewer Commission then presented amended plans to the Board for a system of sewage disposal, and asked to have them approved. These were referred to the same committee to which the original plans had been referred.

Accompanying the plans was a communication from the commission and the report of Mr. Rudolph Hering, consulting engineer, on "Sewerage and Sewage Disposal at Columbus."

Following is the communication above referred to:

COLUMBUS, OHIO, June 13, 1901.

To the Honorable Ohio State Board of Health.

GENTLEMEN: — The Columbus Sewer Commission present herewith for your consideration and approval a plan for the collection and disposal of the sewage of Columbus, Ohio.

The plan consists of the collection of all of the sewage of the city at a point on the bank of the Scioto River, about 2200 feet south of Greenlawn Avenue bridge, by means of a system of combined sewer and an intercepting sewer already built, proposed separate systems of sewers for the West and South sides, together with proposed additional relief sewers in various sections of the city and two proposed small pumping stations, indicated upon a general map of the city on the first sheet of an Atlas of 24 pages of plans filed with your Honorable Body, October 17th, 1900, entitled "Plans for a System of Sewage and Drainage and Sewage Disposal for the City of Columbus, Ohio, to Accompany Report of Julian Griggs, Chief Engineer."

The plan consists further of a main pumping station at the point of collection, of a capacity to handle 20,000,000 gallons per day of sewage, or 40,000,000 gallons per day of West Side storm water, the pumping of the latter required only at periods of high water in the Scioto, when the pumping of sewage will not be necessary.

The force main for sewage will lead south from the pumping station about 10,600 feet to the site of the proposed disposal works on the west bank of the Scioto River.

The proposed disposal works will occupy the east end of the farms now owned by Charles Schwenker and Emily G. Miller, and will consist of four settling tanks each 50 feet by 150 feet by 9 feet deep, of an individual capacity of 500,000 gallons, operated in pairs, through which all of the sewage will pass, followed by 16 covered septic tanks of the same size and capacity as the tanks above mentioned, giving, with a normal flow estimated at 20,000,000 gallons per day, a settling and septic treatment of 12 hours.

The plan further provides for 80 acres of artificial sand filters for the treatment of the septic effluent, when necessary at low stages of the river, at a maximum rate of 250,000 gallons per acre per day.

No suitable materials for intermittent filtration having been found near Columbus, it will be necessary to procure sand from a distance and transport it to the filter sites by rail.

All of the principles involved in the purification of the sewage, as above outlined, are long tried and well established. There is, however, at present a lack of precise knowledge of the best periods for septic treatment with sewage of varying degrees of strength and the per cent. of liquefaction under differing conditions. For these reasons and on account of the unusual expense attending the sanitary disposal of the Columbus sewage, due to the transportation from a distance of all of the sand for intermittent filtration, it is proposed to install and operate under the direction of a skillful chemist for a period of at least one year, ten intermittent sand filters of one acre each, as indicated by plan herewith, with the expectation of showing from the results thus obtained, that adequate purification can be accomplished at a considerable reduction in the estimated cost, by diminishing the total area of 80 acres of filtration, or by providing a less depth of sand than the average of 3 feet proposed in the plan now submitted.

The plan proposed contemplates the use of the river at all times for a purification, by dilution, up to the safe limit of septic effluent, from the sewage of 1,000 people, for each 4 cubic feet per second of river discharge. The table herewith (being Table B. of Mr. Hering's report) shows the "Population, or thousands of persons, whose sewage could have been diluted from 1888 to 1900 by the flow of the Scioto River, Columbus, Ohio, at the rate of 4 cubic feet per second for every 1,000 persons," and indicates that for the 13 years covered by the table, the average period per year, when purification in addition to dilution would have been necessary, is less than 4¼ months per year, varying from nothing in the wet year of 1890 to 8 months in some of the recent dry years.

TABLE B—POPULATION, OR THOUSANDS OF PERSONS, WHOSE SEWAGE COULD HAVE BEEN DILUTED FROM 1888 TO 1900 BY THE FLOW OF THE SCIOTO RIVER, COLUMBUS, OHIO, AT THE RATE OF FOUR CUBIC FEET PER SECOND FOR EVERY 1000 PERSONS. DRAINAGE AREA, 1580 SQUARE MILES.

Months.	Based on Muskingum River Run-off at Zanesville.							Estimated.					Based on records of Ohio State University.*
	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900
January	*440*	*670*	*1250*	*848*	*262*	*131*	*354*	*591*	*212*	*883*	*708*	*1240*	*442*
February	*398*	*502*	*1320*	*1610*	*848*	*1060*	*725*	42	*1315*	*1590*	*1130*	*364*	*570*
March	*488*	*251*	*1490*	*890*	*745*	*923*	*198*	*121*	*1380*	*918*	*713*	*1230*	*827*
April	*283*	*311*	*707*	*558*	*188*	*785*	*266*	*209*	*1275*	*566*	*407*	*304*	*410*
May	*159*	99	*1090*	*151*	*799*	*1150*	*202*	35	*1060*	*354*	124	67	67
June	103	*166*	*580*	*322*	*813*	*276*	*149*	69	*121*	*284*	88	113	71
July	*287*	*195*	*180*	*180*	*266*	99	46	74	106	*213*	71	50	32
August	*237*	78	*173*	121	*212*	57	39	69	71	*142*	53	92	88
September	*216*	99	*806*	69	99	50	53	46	71	77	7	7	11
October	*273*	19	*707*	92	71	*163*	35	28	*142*	106	7	7	7
November	*707*	*211*	*650*	*333*	67	88	57	57	*177*	*354*	21	21	88
December	*297*	*521*	*322*	*364*	85	*515*	*127*	*127*	*177*	*460*	*177*	*152*	67
Average	323	261	775	162	371	516	222	111	537	487	295	301	223

* Made for Ohio State Board of Health.

The figures in italics indicate the months when the sewage from the present population could have been discharged into the river without offense.

ESTIMATED COST OF SEWAGE PURIFICATION WITH 80 ACRES OF INTERMITTENT SAND FILTERS.

Settling and septic tanks for 20,000,000 gallon plant at $7,575 per million gallons	$151,500 00
80 acres filter beds at $8,940 per acre	715,200 00
Force mains and right of way from pumping station	84,961 00
Water mains and hydrants	8,723 00
Electric motors and pumps	3,000 00
Electric transmission and lamps	6,722 00
Well and pump house	2,500 00
Laboratory building	3,000 00
Laboratory supplies	1,000 00
Railroad siding and bridge	60,000 00
Total	$1,036,606 00
10% engineering and contingencies	103,660 00
Total	$1,140,266 00
Land	78,750 00
Grand total	$1,219,016 00

ESTIMATED COST OF SEWAGE PURIFICATION WORKS WITH 10 ACRES OF INTERMITTENT SAND FILTERS.

Settling and septic tanks	$151,500 00
10 acres of filter beds	135,700 00
Other items as before	169,906 00
Total	$457,106 00
10% for engineering and contingencies	45,710 00
Total	$502,816 00
Land	78,750 00
Grand total	$581,566 00

PUMPING PLANT.

Main pumping station and accessories	$105,000 00
Kelton Avenue pumping station	20,000 00
Main Street pumping station	5,000 00
Force main from Kelton Avenue and Main Street stations	15,019 00
Total	$145,019 00

RECAPITULATION OF ESTIMATE.

Sewage purification works	$1,219,016 00
Pumping plants	145,019 00
Improvements and extensions	857,319 00
Grand total	$2,221,354 00

In order that you may be well informed as to the details of the plan above proposed, and more particularly as to the data upon which our application is based, we respectfully refer you to the report of Messrs. Griggs and Alvord of May 1st, 1898, with reference to the sewage and drainage of that portion of the city west of the Scioto River, copy of which you have, and also to the report of Julian Griggs of October 31, 1900, to the Hon. L. B. Kauffman, President of the Sewer Commission, and to the report of Mr. Rudolph Hering of May 6th, 1900, to the Hon. Fred. J. Immel, President of the Sewer Commission, type-written copies of which are herewith presented.

Also herewith we hand you a blue print plan of settling and septic tank proposed, and a blue print plan of the beds proposed for intermittent sand filtration.

Respectfully,
(Signed) Hazard Okey,
Secretary Columbus Sewer Commission.

Mr. Hering's report, a document of much interest, was too long to reproduce here in full. Following are his conclusions, taken from the report:

The existence of the Scioto River, with its relatively large watershed and the fact that no public supply of water is taken from it for domestic purposes for a very long distance below the city, justify the conclusion that the city's sewage, after it had been freed from coarse suspended matter can be discharged into the river in such quantities as we know will by proper dilution; cause no offense.

As the river rises and falls, and changes in the quantity of its flow, so should the discharge of sewage into it be varied and regulated to preserve a safe degree of dilution at all times. This safe degree can be obtained by a flow of at least 4 cubic feet of river water per second for the sewage of 1,000 persons, after it has passed through tanks providing subsidence and septic action.

When the river flow is not sufficient thus to dilute all or any part of the sewage, then, whatever is the quantity of sewage which cannot be diluted, it must be purified before its discharge into the river.

The method of purification recommended to you for this purpose is that obtained by intermittent filtration through beds of sand, located on the tract which was suggested for this purpose a few years ago, namely, on the Miller and Schwenker farms.

There being an insufficient amount of sand for this desired purification on the ground itself, it is necessary to bring to it the necessary quantity of sand of proper quality, and to construct artificially the entire filter beds.

In order to make their filtering capacity per acre as efficient as possible, in other words, to obtain as high a rate of filtration, as consistent with the desired degree of purification, a preparatory treatment becomes necessary.

Taking all the available evidence into consideration, with reference to this problem, it is recommended to you, first, to employ a series of tanks, in the first of which the coarser suspended matter of the sewage would be deposited and from which it can be easily removed, and then, in the remaining and greater proportion of which a septic process would further eliminate the deposited suspended organic matter by its liquefaction.

It is not practicable in the absence of specific knowledge of the Columbus sewage and of its peculiarities, to indicate at this time specifically all of the elements and details which are necessary to accomplish its purification in the most economical manner, and to state the exact area of filters to dispose of that part of the sewage which cannot be discharged into the river.

It is, therefore, recommended that the tanks for preparatory treatment and the filter beds be built in such a manner that from the best present general and local knowledge the desired results will be reached, but to install only a part of the filter plant, say 10 acres thereof, at the present time, and to operate the same for at least one year, for the purpose of ascertaining, under skillful supervision, its greatest possible efficiency and economy. The construction of the remaining part of the plant can then be continued, after knowing with definiteness its best proportions and its best mode of arrangement and operation. In this way advantage could be taken of improvements made elsewhere in this field.

The variation in the character of the sewage, according to the hour, day and season, should then be ascertained in connection with the best operation of the different parts of the plant, the most effective periods of rest, both in the tanks and on the filter beds, the greatest safe rate of percolation through the latter, and the least practicable depth of sand that will secure the desired purification.

It seems probable that the cost of the recommended method, along the present known lines, may then be materially reduced, without a sacrifice of efficiency.

It should not be understood that this suggestion of beginning with a part of the plant implies the construction of tanks or filters which may later be abandoned or essentially modified. The great expense of this work does not warrant the construction of a plant which has purely an experimental character. The proper and safe manner in which to proceed in this case is, in my opinion, to start with what we positively know will produce the desired results, and while operating the first part of the plant, observe by careful investigation all the specific phenomena occurring under the local conditions. The most efficient and economical details will thus become apparent, and the units of the large plant subsequently built can be added and constructed according to this experience. This method of procedure, rational and systematic as it is, appears to be the only one that will, without failure, secure permanently satisfactory work, and by progressing along harmonious lines avoid patchwork or experiment of doubtful value.

Skillful and trained supervision for operating works of this nature is essential to their success. They need special intelligence to adjust variable conditions to constant ends, in the spheres not only of practical engineering, but also of chemistry and bacteriology.

At a meeting of the State Board of Health, held in June, 1901, the committee to which the plans for sewage disposal at Columbus had been referred reported as follows:

Your Committee appointed to consider and report upon amended plans for proposed changes and extensions in the sewerage system of the city of Columbus, would respectively report as follows:

It will be recalled that the Columbus Sewer Commission submitted plans for purifying the sewage in the following manner, quoting from their proposal: "By a 12 hours' treatment by the septic tank process in 20 concrete tanks of 500,000 gallons capacity each, by which a purification of about 50 percent is expected—as measured by reduction in albuminoid ammonia or oxygen consumed."

Reasons were given "Why in the opinion of said Commissioners, the purification proposed should be considered sufficient."

The plans were disapproved by the Board, mainly on the ground that septic tanks alone would not prevent pollution of the river nor remove the nuisance complained of; that open tanks for 10,000,000 gallons of sewage might in themselves constitute a local nuisance, and the lack of exact knowledge of this process under varying conditions, as experiments with the septic tank process had all been on a comparatively small scale.

It was recommended that an experimental plant with a laboratory be introduced to study the character of Columbus sewage and the best manner to purify it.

The plan now presented by the commission to purify the sewage is briefly as follows:

1. To filter the sewage through about 80 one acre beds of sand, artificially prepared, at maximum rates of about 250,000 gallons per acre per day. In other words, intermittent sand filtration.

2. To discharge the sewage into the Scioto River when the river is flowing at the rate of 4 cu. ft. per second per 1,000 population.

To remove as much suspended matter from the sewage as possible, so that the sewage may be filtered at high rates through the sand filters, thereby reducing the total area of artificial sand beds required, and consequently the cost, and also to partially purify the sewage by septic action, it is proposed to

3. Construct four settling tanks (grit chambers) and sixteen covered septic tanks, each of 500,000 gallons capacity. By the use of these tanks Mr. Hering, Consulting Engineer, estimates that about 60 percent of the suspended matters and 25 percent of the organic matter may be removed.

It is proposed to install the full complement of tanks in the beginning, and ten acres of sand filter beds, to be operated one year experimentally. A laboratory is to be provided for a proper study of the character of the sewage, the operation of the tanks and filters, and to determine whether a less quantity of sand, which is to be brought in by railroad, will give satisfactory results.

In this plan, it will be noted, the chief reliance is placed upon sand filtration, and sedimentation and septic action are used to prepare the sewage for the most rapid filtration possible, so as to cut down the great cost of constructing artificial filters.

The different steps of the process may now be taken up singly.

1. The Committee favors turning the sewage into the Scioto River whenever this can be done without creating a nuisance. It will be advantageous to remove, as proposed, as much as possible of the suspended matter, which will include part of the organic matter, before turning the sewage to the river. It is probable that the dilution proposed, 4 cu. feet per second per 1,000 persons, will be sufficient. This is only an esti-

mate, however, and the Committee recommends that instead of approving a certain percentage of dilution, it be provided that no unfiltered sewage shall be discharged into the river except at such times as this can be done without creating a nuisance, or injuriously polluting its waters.

2. We favor the immediate installation of the four sedimentation tanks.

3 ~~4.~~ We doubt the wisdom of installing 16 septic tanks in the beginning. A year's study of the character of Columbus sewage is to be made, and its behavior in covered tanks. The 20 tanks give a 12 hour treatment of 20,000,000 gallons of sewage per day. The present flow is probably not above 16,000,000 gallons.

It is not at all certain that a twelve-hour septic treatment will give the best results. It may be that a period considerably shorter will suffice.

While it is important that the laboratory recommended should be used to determine how much sand will be required for filtration, it is equally desirable that the size and total capacity of tanks required for the best results should be known.

We would strongly urge, therefore, that the recommendation be made by the Board that the entire number of tanks proposed should not be constructed in the beginning. With the four sedimentation tanks, and a sufficient number of septic tanks to determine by experimental studies how to best use this process for preparing the sewage for filtration, an opportunity will be left to improve present plans for this part of the plant, should experience show this to be possible.

It will be noted that the estimated cost of the tanks per million gallons of sewage to be treated is $7,575, while the cost of filter beds is $8,940 per acre. If a year's operation of the plant, aided by laboratory studies, is desirable to determine whether a less filtering area than recommended will be sufficient, why should not the still more uncertain question of the number and total capacity of septic tanks required be solved in the same way and at the same time.

4. It is scarcely necessary to say that we fully approve of the proposed sand filtration of sewage; the most certain of all known processes of sewage purification. We consider it necessary, however, that the entire area of 80 acres, or so much thereof as is found by a year's experiment to be necessary to properly purify the sewage, should be installed without unnecessary delay.

To sum up our conclusions we respectfully recommend that the proposed plans to extend the sewerage system and purify the sewage of the city of Columbus be approved, upon the following conditions:

1. That the sewage disposal plant shall be fully completed at the earliest time practicable.

2. That the area of filter beds shall be amply sufficient to purify all the sewage.

3. That in the operation of the plant, after its completion, raw or partially purified sewage shall at no time be discharged into the river in amounts sufficient to create a nuisance.

The Board voted, at that meeting, to approve plans for extending the sewerage system of Columbus, and for sewage purification work as presented June 13, 1901, subject to the conditions named in the committee's report; and the Board recommended, without making it a condition of approval, however, that only a sufficient number of septic tanks be constructed in the beginning to determine by further study the number and size of tanks that will ultimately be required.

Notice of this action was sent to the Sewer Commission July 2, 1901.

REPORT ON PROPOSED ADDITION TO THE CONNEAUT SEWER SYSTEM.

Plans for sewers for Districts No. 3 and No. 4 of the city of Conneaut, as prepared by Mr. George S. Pierson, Consulting Engineer, were presented to the Board for approval.

Following is a copy of a report by Mr. Pierson, to the mayor and council of Conneaut:

To the Honorable, The Mayor and Council of the City of Conneaut, Ohio,

Gentlemen: — I submit the following report in explanation of the plans of sewers in Sewer Districts Nos. 3 and 4, submitted herewith.

Sewer District No. 4 lies north of the Lake Shore Railroad and upon the west side of the Conneaut River and includes an area of about 250 acres. Over the greater part of this area the surface is quite uniform, sloping gently toward the north and east. Along the eastern part of the district near the river, the surface is broken by an irregular bluff, rising some 60 or 70 feet above the river.

In some parts of the district the soil is not naturally well drained and water collects in excavations which are made and does not readily drain away. The Conneaut River at this point in times of flood is a large stream and discharges a great amount of water, rising at times to about five feet above its normal level. During the dry season, however, it discharges but very little water and is more of an arm of the lake than a stream. It is at this point quite deep and wide, and, as the surface of Lake Erie fluctuates in the harbor from winds alternating in direction, the water rises and falls in the stream. Probably during the dry months of late summer and early fall the waters of the river are changed more from this cause than from any current which may be due to the flow of the stream proper.

Sewer District No. 3 lies north of Sewer District No. 4 and along the Conneaut River farther down, and has an extent of about 175 acres. It is bounded on the north by Lake Erie. The surface inclinations and the condition of the subsoil and natural drainage are very similar to those in Sewer District No. 4. It lies at a slightly less elevation above Lake Erie and the Conneaut River, its average elevation above the lake being about 50 feet.

There is now a natural depression extending from the lake, south, through Sewer District No. 3, which collects and through which is discharged the storm water from a considerable area in these districts. Toward the north this depression is some 8 or 10 feet deep, but as it extends southward it becomes less marked and gradually blends with the generally uniform surface of the ground. Unfortunately, the discharge through this depression is directly at the water works intake. Except during storms no more water discharges through this depression than naturally seeps out of the soil along its border. It now receives the drainage from a few privies and outhouses which have no other drainage facilities. With the introduction of sewers, however, these buildings will be otherwise provided for and the condition along this depression will naturally be much improved.

As the streets are graded in this portion of the city and the discharge of storm water into it is intercepted and taken into the sewers or down the paved streets, the tendency will be to fill this depression, and it will, naturally, as the years go by, collect less and less surface water. This is desirable if the water works intake is to be maintained in its present position.

Nearly the entire water front of both districts is bordered by the ore docks or tracks of the Pittsburg and Lake Erie Railroad Company. An immense traffic is carried on over these tracks and over the docks and the arrangements which have been installed for handling this traffic must be considered in determining the points at which sewer outlets must be placed. The location of these outlets must also be harmonized with the natural conformation of the ground, so far as possible, so that the main sewers may closely follow the natural drainage channels and may thus be built at a reasonable cost.

All sewage shall be discharged from the opposite side of the pier from the water works intake, and it is also desirable that the storm water from the street pavement be discharged upon this side of the pier. There are two points which best meet these requirements and at these points I have located the main outlets from each district, as will be seen by reference to the maps submitted herewith.

It is proposed to discharge the sewage into Conneaut River for the present without treatment. Evidently, however, the continued growth of the city and the gathering of other industries along the bank of the river may render it necessary at some future time to purify the sewage, at least partially, before it is discharged into the river. The tendency of the health boards is, year by year, toward a greater strictness in regard to the fouling of streams, and the tendency of Legislative enactments is markedly in the same direction. The Ohio State Board in particular is giving this matter careful attention.

To develop plans for these sewer districts without forecasting this necessity in the future and arranging them with reference to this ultimate necessity, would, therefore be unwise. I have therefore arranged the grades of these outlets so that the sewage may be diverted from the main sewers for treatment, at some future time, and the purified effluent may be returned to them at a lower level. A difference in level of not less than 10 feet has been provided for the outlet of Sewer District No. 4., and at the outlet of Sewer District No. 3, a still greater difference in level is available. This amount of fall is sufficient to handle the sewage by gravity through any of the modern purification plants.

The points at which I have thus planned to divert the sewage at the outlets is indicated upon the general map by a switch. It is proposed in the future to arrange these switches so that all of the ordinary flow of sewage and the first washings from the street pavements will pass through the sewage purification plant, and the excessive discharge from heavy rains will pass directly down the main outlet sewers and not through the purification plant.

It is not feasible in any system of sewage purification to pass through the purification plant all of the storm water which might be discharged during excessive rains, and a discharge of a portion of this at such times directly into the stream without treatment is entirely permissible and is usual in all purification plants dealing with storm water.

The restrictions concerning outlets which are due to conditions previously recited, make it advisable to discharge both the storm water and the house sewage at the same points; and, in order to avoid the construction of double lines of outlet sewers — one for the house sewage and another for storm water only — I have provided for the discharge of both house sewage and storm water through the same outlet. The outlets which are used for this double purpose are, however, comparatively short, extending in District No. 3. only to the angle in Harbor Street, at which point the switch is located. Above this point there will be two separate systems, one of which will receive house sewage only and the other will receive storm water only.

The house sewage coming from this district may therefore be treated in a sewage purification plant unmixed with storm water, which is desirable; or the first washings of the storms, which are the most foul, may also be diverted to the sewage disposal-plant, if it is desired to do so, and the storm water which comes later and in excessive volume may pass directly to the outlet without treatment.

In Sewer District No. 4. there are two main outlets which receive storm water at Harbor Street and below. In this district the purification plant is located at the junction of these two main sewers, and a complete separation of the house sewage and storm water at the disposal plant is not attempted, the intention being to ultimately purify all of the house sewage which is discharged from this district, and as much of the storm water as may be advisable.

A complete separation of the house sewage and storm water in this district is entirely possible, but would entail a double line of sewers from the purification plant to Harbor Street, and I believe the requirements are not such as to justify this additional expenditure.

Only a reasonable provision has been made for storm water. The sewers are not proportioned large enough to discharge all of the storm water from excessive rains such as might occur at intervals of two or three years. Such a provision would entail an expenditure which is not necessary. At such times the excess of storm water which cannot be discharged by sewers of the sizes I have indicated, may flow upon the pavements for a short time; and in paving the north and south streets the cross walks should be arranged in such a manner that if the catch basins and sewers cannot carry the excessive flow, it may pass down the streets upon the pavements for several blocks without rising above the curb line. It is not contemplated that this will occur in the immediate future except at very rare intervals, but as the territory is developed and becomes more impervious, year by year, the proportion of storm water reaching the sewers will become greater and greater and the necessity for such a provision for excessive storms will be apparent.

In this connection I give the following statistics of rainfall at Erie, near Conneaut, which have been kindly furnished me by the officer in charge of the Government Station at that point:

July 27th, 1898	.49	inches	in	10	minutes,	rate	2.9	inches	per	hour
June 27th, 1900	.65	"	"	15	"	"	2.6	"	"	"
" " "	.87	"	"	20	"	"	2.6	"	"	"
" " "	1.05	"	"	25	"	"	2.55	"	"	"
" " "	1.54	"	"	30	"	"	3.1	"	"	"
" " "	1.68	"	"	35	"	"	2.9	"	"	"
August 12th "	.47	"	"	5	"	"	5.9	"	"	"

The storm of June 27th, 1900, is the one which would probably most severely tax the sewers. During this storm water fell for a considerable period at the rate of about 3 inches per hour. Not all of this would reach the sewers; but when it is understood that the sewers I have designed will discharge not more than ½ inch per hour of rain over the entire surface tributary to them it will readily be seen that provision must be made for the discharge of some surplus storm water over the street surfaces.

The sewers will be adequate for the discharge of all house sewage proper which is likely ever to come from this territory.

The proper drainage of the subsoil over a considerable portion of the area we are considering is a matter of great importance and this is provided for by tile drains laid in the trenches with the sewers and which operate in precisely the same manner as tiles laid in ordinary farm drainage except they are laid much deeper and their influence will be felt for a much greater distance to right and left from the drains. When it becomes necessary to purify the sewage it is very desirable to reduce the amount of water which comes to the purification plant to the least possible amount and it is therefore desirable to discharge these subsoil drains into the main outlets at points below where the sewage will be diverted for treatment.

The proper size for subsoil drains can best be determined when the trenches are opened and the conditions of the subsoil more accurately determined. The indications are, however, that over most of the territory the subsoil does not readily permit the passage of water and that the surface soil is such that no great proportion of the rainfall sinks into it, and therefore no great capacity will be required in the subsoil drains.

(Signed) George S. Pierson.

The Engineer of the Board was directed to go to Conneaut to make an investigation, which he did August 15th, and reported as follows:

It is intended to add two districts, Nos. 3 and 4, to the one already established, No. 1. No. 4 is to drain the district just north of the Lake Shore railroad, and No. 3 the district still further north, or the harbor section. The plans include a complete system for these districts, but it is intended to put in only a portion at the present time; 11,000 feet in No. 3, and 12,000 in No. 4. The sewers designed are for sewage only, except a short distance back from the outlet, where they are intended for both storm and sanitary drainage. The reason for the combined outlet is that it was not considered necessary to purify the sewage at once, but that it might be in the future, so a separate system was designed with but one outlet at present so as to save expense.

In district No. 4 there will be no storm sewers constructed at the present time, owing to good natural drainage and the lack of paved streets.

In No. 3 a short storm sewer will be built to care for the drainage of two streets which it is intended to pave. This short storm sewer will divert some of the objectionable drainage from the swale leading down past the water-works, but all of it will not be taken until more of the streets are paved. At the present time there is a short sanitary sewer in District No. 3 which is now using the outlet proposed for the whole district. It formerly had a separate outlet, but this was accidentally closed up, and the sewage caused to flow out over the ground from one of the lower man-holes. To remedy this nuisance a new outfall was constructed, and it is this outfall which it is now proposed to use for the whole district. The outfall consists of a 36-inch iron pipe line extending under the ore docks, and emptying into the Conneaut River some distance back from the mouth of the harbor. This sewage will empty into a large body of water, which is changed but little by the flow of the stream, but more by the rise and fall of the lake and the passing steamers. In District No. 4 one short piece of sewer has an outlet to the Conneaut River at a point just north of the Lake Shore Railroad. This empties into the river near the head of slack water, where a large amount of sewage would cause a nuisance, but it is not expected that the small amount tributary to this short sewer will cause any trouble. It is not intended to construct this sewer at once. The main outlet for No. 4 is to the river at a point further down, well into the slack water. This outlet is to be a 36-inch brick sewer, extending under the yards of the P. B. & L. E. Railroad, and entering the river at a very unfrequented spot. Here also a large amount of sewage would be likely to cause a nuisance, but the small amount to be expected for a number of years will probably not cause any trouble.

The completion of these proposed sewers, especially in District No. 3, will prevent much objectionable drainage from washing down past the water works, and will divert it, together with an increased amount of sewage, to the harbor where it can only reach the water works in a more or less diluted condition and then only with favorable winds. Of course, a large amount of sewage would pollute the waters of the lake for a considerable distance from the harbor.

When purification is necessary the sewage and the first part of the storm water can be diverted at the head of the short piece of combined sewer and the latter used as an outlet for storm water only. No plans have as yet been prepared in reference to disposal. The districts are not thickly settled as yet, and it was desirous to postpone purification until the quantity of sewage should increase and the city better able to pay for same.

It must be stated that the sewage from District No. 1, the main portion of the city, is emptied into the Conneaut River a short distance above the Lake Shore bridge, and that at the present time it is causing a serious nuisance. The sewage is not carried to the channel of the stream and collects in the stagnant water along the edge, depositing the solid matter over quite an area. Much of this nuisance could be abated by carrying the sewage to the channel, but it is a question whether all of it would be done away with by this alone.

The Board voted to approve these plans subject to the condition that the sewage is to be purified in a manner satisfactory to the State Board of Health whenever in the opinion of the Board this may become necessary.

Notice of this action was sent to the Consulting Engineer, Mr. Pierson, August 23, 1901.

REPORT ON A SYSTEM OF SEWERAGE AND SEWAGE DISPOSAL FOR DELAWARE.

Plans for a system of sewerage and sewage purification works for the city of Delaware were presented by Mr. J. P. Force, Consulting Engineer. In addition the following report descriptive of the plans was filed with the Board:

Delaware is situated on the Olentangy River 24 miles from Columbus and, according to the census of 1900, has a population of 7,940.

While the city has for a number of years been provided with a system of water works, no sewerage system has as yet been constructed. There are several storm water sewers, however, which are used for the conveyance of sewage, a number of connections having been made in the business part of the city.

It is now proposed by the City Council and Board of Sewer Commissioners to construct a system of sanitary or separate sewers and sewage purification works.

The plan of the sewer system was prepared several years ago by Mr. L. B. Denison, C. E., now Chief Engineer of the Board of Sewer Commissioners. As before stated, the system is to be a sanitary or separate one, all storm and roof waters being excluded, provided with man holes and flush tanks, and with grades to insure ample velocity. Where necessary, sub-soil water will be drained by sub-drains placed beneath the sewers.

The sewer system presents no new features, but will follow the best practice.

It being necessary to provide works for the purification of the sewage before its discharge into the Olentangy River, I have made a thorough investigation of the local conditions with a view of designing such works.

The results have been somewhat discouraging.

There is no soil suitable for intermittent filtration, or irrigation, properly located for use.

Test pits show the material to be a stiff clay.

There is not sufficient difference in elevation between the invert of the proposed main sewer (placing the same high as possible) and the mean low water in the river for the proper operation of intermittent sand filters if the same could be artificially constructed unless the entire sewage should be lifted by pumping.

The expense of operating chemical precipitation works would at present render the construction of a sewer system impossible, as the authorities are decidedly opposed to any large running expenses. In view of these conditions I have arranged a plan for the purification of the sewage by a double treatment, consisting of what is known as the septic treatment in masonry tanks, followed by nitrification in coke contact beds.

While at experimental stations (notably the Massachusetts State Board of Health station at Lawrence) and for a number of municipalities, very good results have been reported from this form of treatment, it is also true that occasionally failures have resulted from apparently the same process.

This is also true of every known form of sewage purification. There is no process that, however successful in one place, has not proved a failure at some other place. Chemical precipitation gives excellent results at Canton, Ohio; was a failure at Orange, N. J., and at Worcester, Mass., it has been the *casus belli* of a famous law suit.

Intermittent filtration has been eminently successful at South Framingham, Mass., and scores of other places. At Plainfield, N. J., and Pullman, Ills., it has been a failure. Some filtration areas are practically odorless, others, on the contrary, smell fearfully. Wherever man endeavors to assist or hasten nature in her functions he must do so in conformity with natural laws or the results are not perfect. Any one who has endeavored to purify sewage from cesspools by either chemical precipitation or intermittent filtration will realize the difficulty experienced at Andover, Mass., (as related in Mass. State Board of Health report for 1899, pages 430 to 432) where an attempt was made to purify by contact beds sewage 24 hours old upon its arrival at the septic tanks and after a septic-treatment of 24 hours' duration, and will concur with the statement in the report that, "It is certain that, if the anærobic process is carried too far, there may be a formation of distinctly poisonous bodies, which might prevent nitrification."

It plainly appears from all investigation and experiments in the septic treatment of sewage that in order to be successful, works must be so designed as to admit of a certain amount of elasticity in the process, so that it will be possible to vary the rate of flow through the tanks in order to obtain the best results. In a case like the one before us where the sewer system will receive at first but a small quantity of sewage, which will gradually increase in volume, it is difficult to arrange works of any description that will give good results from the very beginning. The form of treatment proposed, however, has this in its favor, that by commencing with a small quantity, and gradually increasing the amount of sewage applied, nitrification is fully established in the contact beds before the amount applied reaches the maximum.

DESCRIPTION OF PROPOSED WORKS.

The plan presented for the purification of sewage of Delaware consists, as before stated, of masonry tanks for the septic treatment of the sewage and of coke filters or contact beds. The general plan is arranged for the purification of one million gallons of sewage, allowing the sewage to pass through the tanks in 12 hours and the rate of filtration in the contact beds to be 400,000 gallons per acre in 24 hours. At the same rate of working, per cubic yard of material in the contact beds, the Lawrence, Mass., filter No. 103, treating septic sewage during 1899 combined with the work of the septic tank, shows a total average removal of organic matter amounting to, for free ammonia 82 per cent., and albuminoid ammonia 89 per cent. The contact beds proposed for Delaware are on account of the limited difference in elevation between the sewer and the river only 3 feet in depth, but as sewage does not pass directly through them but is treated while held in contact with the bed, the allowance of sewage per acre is computed from the volume of the coke forming the bed and not from the surface area. Thus the proposed contact beds, being three-fifths of the depth of the Lawrence filter, are to receive only three-fifths of the amount of sewage applied to the latter. The contact beds are arranged in groups of three for convenience in operating, the automatic distributors and discharging devices to be described hereafter. Each bed contains an effective area of 22-100 of one acre. The surface of the coke will be covered with 3 inches of coarse, clean gravel. The drainage system is shown on the plan.

The septic tanks are to be constructed of masonry and with concrete floors, the whole interior surface to be plastered with a coating of Portland cement mortar. They have a total capacity of 500,000 gallons, and are divided into four tanks of 100,000 gallons and two tanks of 50,000 gallons capacity each. Each tank is provided with inlets from the main sewage channel discharging 3 feet below the surface through an arrangement shown on the drawings which will tend to spread the flow and distribute it uniformly the whole width of the tank. The outlet arrangement is somewhat similar, being a slotted pipe extending the whole width of the tank and 3 feet below the surface.

Both inlet and outlet pipes will be provided with valves so that the flow may be controlled and rendered uniform or cut off entirely.

Before the sewage enters the tanks it will pass through a grit chamber, so constructed that by the use of flash boards, one side may be cleaned while the other is in operation. The velocity of the flow will be checked at this point sufficiently to admit of the deposit of sand or road detritus carried by the sewage but not enough for the accumulation of sludge.

As it will probably be necessary from time to time to remove a portion of the sludge from the tanks, arrangements have been made by which it is believed this may be accomplished without emptying the tanks or interfering materially with the regular flow through them.

A steam boiler, and horizontal duplex pump having ball valves, will be located in a small building near the end of the tanks. The suction pipe from this pump will be laid along the top of the walls of the tanks and will be provided at intervals with "T" openings ordinarily closed with a cap. When it becomes necessary to clean a tank, a flexible suction hose will be connected with each of these "T" openings in turn, and the suction end of the hose will be placed on, or near, the bottom of the tank and moved around slowly while the pump is running. By using a specially arranged handle the hose may be moved freely in any direction without breaking the scum on the surface except sufficiently for the introduction of the hose.

In regard to the disposal of this sludge: I believe it best to pump it to furrows ploughed in the soil and cover it lightly with earth, using lime if necessary. It would evidently be impossible to press this very stale sludge in a filter press and with properly controlled works and the amount to be dealt with should easily be handled in the manner I have indicated.

LOCATION OF WORKS.

It is proposed to locate the works as shown on plan east of the C. S. & H. R. R. and south of the C. C. C. & St. L. R. R.

This location insures the complete isolation of the works for all time to come. The land immediately north of the tract selected has been platted for over 30 years but no buildings have been erected, and it is at present the property of the C. S. & H. R. R. Company, and used as a farm. The nearest dwellings to the works are a farm house southwest of the works and distant 1,600 feet, and a small house northwest of the works and distant 1,650 feet.

Should the septic tanks prove to be the source of some odor, it is hardly incredltable that it would be in any way offensive at that distance. The tract of land selected contains about 12 acres.

PRESENT INSTALLATION.

Although the general plan presented provides for the disposal of 1,000,000 gallons of sewage per day, that amount is largely in excess of the amount to be disposed of if every inhabitant of the city was at present using the sewers freely. The plan is offered for that amount simply to show the possibility of extension as the population increases. It is proposed to construct at present only sufficient to serve the needs of the city for a few years and establish the practicability of the process before additions are made.

Should it be demonstrated by the operation of the works that the septic process followed by treatment in coke contact beds will furnish insufficient purification, the required results can be obtained by passing the effluent from the beds through a second filter constructed in the same manner. These secondary filters need not be so extensive as the primary ones, as the rate of flow through them can be largely increased and excellent results be secured. In order to pass the sewage through a second set of filters, however, pumping will have to be resorted to, which on account of the expense entailed should be avoided if possible.

Another change might be effected by making a few minor alterations in the tanks and providing a sludge press and chemical mixer which would convert the works into a chemical precipitation process followed by treatment in coke contact beds. This would render the works a duplicate of the ones at Glenville.

There being no soil for intermittent filtration or irrigation at Delaware, it is plain that whatever the form of treatment adopted the sludge must be removed by either chemical or septic treatment before filtration.

This being the case it is reasonable to suggest that an inexpensive process that has proved successful in many cases should be given a thorough trial before resorting to a more expensive form of treatment which will not likely give better results.

For the above reason I deem it wise to provide capacity at present only sufficient for 250,000 gallons of sewage per day. If the works prove satisfactory additions can be made from time to time as the flow increases. Should changes or modifications be required they can be made in providing for the future without material loss. The amount of 250,000 gallons is suggested by the arrangement of the filters, as that is the amount that can be disposed of, at the rate per acre assumed, by using a series of three beds. The tanks proposed for the first installation, however, are of a size sufficient to dispose of 400,000 gallons at a 12-hour rate of flow. It is proposed to use these tanks, however, separately, as the flow increases, and at the rate which experience demonstrates to be the one best suited to the sewage handled. Two hundred and fifty thousand gallons will represent 40 per cent. of the present population at the rate of 75 gallons per capita, which I deem an ample allowance for the first installation of contact beds.

OPERATION OF WORKS.

The operation of the works is designed to be as far as possible automatic in its nature. This is for the purpose of insuring extreme regularity at all times, day or night. Nothing important will be left wholly at the mercy of a possibly careless attendant.

The sewage after passing through the septic tanks will flow from the main pipe through a branch feeder to one of the sets of three beds. This pipe is constructed for a short distance in the form of an inverted siphon, the discharging end rising vertically in the center of a brick chamber; this pipe will terminate in a brass ball and socket joint, to the upper flange of the movable part of which is attached the distributor. This distributor is formed into three channels radiating from a common center, the channels themselves formed of galvanized iron are pitched to an angle above the horizontal so that when one is level in position to discharge the other two are elevated. These movable channels connect, when in a position to discharge, with inverts in the bottom of the masonry chamber, which in turn connect with discharge pipes to the surface of the coke beds. From each coke bed a line of 1½ inch pipe is lead to a separate compartment in the chamber, and in each compartment is a float connected with the movable distributor. The operation of this device is as follows: The movable distributor is placed in position to discharge into the channel leading to bed No. 1, and the septic sewage rising in the discharging end of the inverted siphon will flow through the channel and pipe to bed No. 1. When the sewage rises to a point just beneath the surface of the bed, sufficient will flow through the pipe leading to the float compartment to fill it and raise the float, which will in rising turn the distributor so that the discharge will be switched to bed No. 2. This will take place as each bed fills, so that each one will receive just sufficient to fill it in turn no matter how irregular the flow of sewage may be.

The emptying device is also automatic in character.

The main underdrain from each bed will lead into a brick chamber containing a siphon provided with an air valve. As the sewage rises in the bed the air will be compressed in the descending limb of the siphon, but the siphon will not discharge when the bed is filled until the compressed air is released.

Each bed will stand full in turn until the sewage rises to a certain point in the next one, when the sewage will flow through a small pipe to a float chamber, and lifting the float will open the air valve and start the siphon in operation, which will empty the bed.

The time of standing for each bed is capable of perfect adjustment.

By the devices above described it is believed that a very regular and even distribution of the sewage and time of contact can be secured. The designing of these automatic devices is largely due to my associate, Mr. H. J. Shaw.

It will be noticed that three valve chambers are shown on the plan and numbered 1, 2 and 3. These valves are designed to work automatically and prevent any damage to the works by a sudden rise in the river. During the ordinary spring freshets the valve in chamber No. 2 will close and the septic sewage from the tanks will flow into the river. At such times the flow is not less than 900 cubic feet per second in the river, which would give a dilution for a population of 8,000 of over 112 cubic feet per second per 1,000. In times of excessive floods the automatic valve in chamber No. 1 will close to protect the tanks and the flow of sewage will be diverted directly to the river.

In a flood like the one occurring in March, 1897, the river would rise to a depth of six feet over the level of the tract of land on which the works are to be located, which will be protected by a levee. At such an elevation the valves in chamber No. 3 would remain closed to prevent back water flooding basements connected with the sewers. The valves will all reopen in regular order as the flow in the river subsides, and the regular operation of the works automatically resumed.

As before stated, a number of connections have been made with the storm water sewers of the city. Hotels, business blocks and the city hall furnish a quantity of sewage which flows to the river through a run unpurified. This sewage is the source of disgusting odors in the city itself and is a nuisance which should be abated. If the sewage of the entire city was discharged into the river after receiving a treatment equal to the removal of only 80 per cent. of the organic matter the river would not receive more organic matter than it does at present. And the present nuisance and menace to health in the city would be removed. By the works proposed the removal of not less than 85 per cent. of organic matter is confidently expected. Further purification in the stream itself is assured by the fact that below the proposed outlet there are extensive ripples which will tend to aerate the effluent, which will then flow through long quiet stretches of the river where the completion of the nitrifying process will be effected.

These plans were approved by the Board subject to the following condition, namely, that samples of purified sewage should be furnished the Board from time to time, as it might deem necessary, for examination, and if the sewage at any time was, in the opinion of the Board, insufficiently purified, the city of Delaware should cause to be made such changes of or additions to the purification plant as might be necessary to purify the sewage to a degree satisfactory to said Board.

Notice of this action was sent to the Consulting Engineer, Mr. J. P. Force, March 4, 1901.

REPORT OF ADDITIONAL SEWERAGE FOR FINDLAY.

At a meeting of the State Board of Health held January 16th, 1901, members of the Board of Health of the city of Findlay and representatives of council, presented plans for sewers for District No. 2 of said city.

The plans provide in brief for a trunk sewer to carry storm water from all the territory between Main Street and Eagle Creek, and from the first alley north of Hancock Street to the Blanchard River, in addition to sanitary sewerage for all the territory between Main Street and Eagle Creek and lying between Sixth Street and the Blanchard River.

A second trunk sewer to carry all storm water from the territory lying between Main Street and Factory Street, and from the Findlay, Fort Wayne and Western Railway to the Blanchard River.

A sanitary sewer to receive the entire sanitary flow from the West Street sewer, the county sewer in Park Place, and the two Main Street sewers which now discharge at the south end of Main Street bridge. Said sewer to continue east in Front Street to the trunk sewer in East

Street and there receive the entire sanitary flow from the proposed trunk sewer in East Lima, Park and Hancock streets. The sanitary sewer is to discharged into the Blanchard River directly north of the north end of Broad alley.

The Board voted to approve the plans submitted upon the condition that the sewage should be purified in a satisfactory manner whenever that should become necessary, as determined by the State Board of Health.

Notice of this action was sent to the council of Findlay on January 29th, 1901.

REPORT OF PROPOSED SEWER SYSTEM FOR GREENFIELD.

Dr. Frank Warner having been appointed a committee to investigate plans for a sewerage system for the village of Greenfield, reported as follows:

According to the last census, Greenfield had a population of 3,979, showing a very good growth for the last few years; due largely to the introduction of quite a number of new industries.

The surface drainage of the village is to Paint Creek direct and to two runs which empty into that creek. These same runs carry the sewage from a number of houses and buildings, containing 65 water closets in all, and cause considerable nuisance at times.

The plans for sewerage include 5 miles of sanitary sewers to which all the house drainage will be diverted, also two lines of storm sewers, following the general line of the above mentioned runs, for surface drainage. All the sanitary sewers lead to one outlet sewer which is to empty direct into Paint Creek at a point in the southeastern part of the village. The sewer is conducted across the low land bordering the creek, under a mill race, and is emptied into the creek below the dam which diverts the water to the above mentioned race. The outlet consists of a few lengths of iron pipe which are run out into a pool of water in hopes of preventing a nuisance by keeping the outlet submerged. No purification scheme has been proposed as yet as it was thought the number using the system would be small at first, and that the creek could take care of the sewage for a number of years.

As stated above there are 65 water-closets in use now and it is claimed that the drainage from these will be diverted to the new system. If a little more judgment had been used in locating the outlet there would probably be no trouble from the sewage for a few years at least, but with the outlet below the dam which diverts practically all the low flow of the river to the race and carries it one-half mile down stream before returning it to the creek, there will not be in times of low flows enough water leaking through and over the dam to carry the sewage away.

The sewage will stagnate in the stream, and in putrefying will give off very objectionable odors, which will cause a decided nuisance. At times the foul smells will be blown over the lower portion of the village and cause local complaint, besides the complaints which must be made by the property owners along the creek.

Paint Creek has a drainage area, above the proposed outlet, of 245 square miles, or 61 square miles per 1,000 of population of the village. According to Hazen's estimate, this village will require some method of purifying the sewage as soon as the system is in general use, with even all the flow of the stream available for the dilution of the sewage, which is not the case here.

With even a larger drainage area available, per 1,000 of the population, than is the case at Greenfield, it has been experienced in this state that even a partial system of sewers has caused an objectionable nuisance. For example, at Tiffin, Upper Sandusky, Bucyrus, Mansfield, Galion and other places.

In view of these facts and conditions your committee would respectfully recommend that the system as planned be approved only with the condition that within one year from the time that the proposed outlet is first used, the sewage will be purified in a manner that shall be satisfactory to, and shall be approved by, the State Board of Health.

On the day of inspection, December 6th, 1900, the sanitary sewer was completed for about 2,800 feet, all of which was in the lower part of the system and included the outlet.

The Board was of the opinion that a nuisance would be created by turning sewage into this creek as soon as the sewers came into general use, and it therefore voted to approve the outlet which had already been constructed upon the condition that the sewage should be purified in a manner to be approved by the State Board of Health within one year from the time that the present outlet was first used. Notice of this action was sent to the mayor and council of Greenfield January 29th, 1901.

REPORT ON PROPOSED SEWERAGE FOR JACKSON.

Messrs. Riggs and Sherman, Consulting Engineers, of Toledo, on the part of Jackson presented plans for a system of sanitary sewers for that city and asked that they be approved. They submitted the following communication giving additional information:

The topography in this vicinity is peculiar. The business section of the city and a large part of the residence section is located upon a knob which drains in all directions — to the north into Salt Creek, and to the east and south into a small stream known as MacDowall's Run. These streams carry a considerable amount of storm water at times of rain fall, and often spread out over the plats for a distance of several hundred feet, and having a depth of from 10 to 15 feet in extreme high water. For several months in the year they carry a very small amount of water, and in midsummer are practically dry.

The topography of Jackson requires an excessive amount of main sewer, and owing to the exceedingly light grades some of the sizes are kept-large to provide sufficient capacity.

The system, as shown, is a sanitary system, all storm water to be excluded rigidly from the sewers; man-holes to be placed at all interceptions and all angles in the sewers, and flush tanks to be provided for at all dead ends.

Owing to change of date of the meeting, and owing to the illness of the writer, it has been impossible to complete the plans for the disposal works. It is our intention to submit by mail, or at your meeting, plans for sewage purification works, to be installed at the time sewers are built.

We have been making extensive inquiry into prices of materials, and we find there is some question as to what will be the more economical system.

There is no sand in the vicinity and no gravel which is at all suitable for filtration purposes, so that all material for filters must necessarily be brought from a distance. We now expect to recommend the adoption of the following system:

First. Pumping station and collecting well, which we intend to make of sufficient size to provide for the limited amount of septic action for admitted sizes. From the well it will be necessary to carry all sewage by force main to the disposal area, no matter where it may be located. The grades of the main sewer are so flat that it is out of the question to consider carrying sewage by gravity to any form of disposal works.

Second. Intermittent filtration unsupplemented by any other process than that of screening, which will be done at the well.

It is our opinion that this will meet with all of the present requirements of the city. If it be found that further purification is necessary, the septic tanks or chemical purification may be installed later. We do not, at present, feel like recommending the expense which would be entailed by the construction of septic tanks, and in as much as the stream into which we discharge is not used for water supply at any point, and flows through a wild and broken country rather sparsely settled, we feel that intermittent filtration will prove ample for the needs of this community.

We therefore ask your approval of the plans, subject to the immediate purification of sewage, by such methods as may be subsequently approved by you. We ask this action in order that we may prepare our estimates, and have the matter submitted to the people at a special election, without being crowded for time in the preparation of detail plans for the purification works.

We propose to push the plans for the purification works as rapidly as possible, and hope to submit them by mail before your next quarterly meeting.

At a meeting of the Board, held April 10th, 1901, it was voted to approve the plans for a system of sanitary sewers for the city of Jackson, provided that sewage purification works, satisfactory to the State Board of Health, be installed prior to the use of the sewers.

Notice of this action was sent to the Consulting Engineers April 29, 1901.

REPORT ON PROPOSED SEWERAGE FOR KENT.

A communication was received from the Sewer Commission of Kent stating that they were proposing to construct sewers for the village and that they wished to be informed in advance, if possible, whether they would be permitted to discharge sewage into the Cuyahoga River without purification.

The Engineer was sent to Kent to investigate, and submitted the following report:

Kent is a growing village with a population by the last census of 4,541. It is a manufacturing town having the following industries: The Erie Railroad shops, file works, chain works, lock works, canning factory, condensed milk factory, and the usual saw, planing and flour mills. The main portion of the village lies on the southeastern side of the Cuyahoga River, with a considerable residence district on the opposite side.

The public water supply is principally from wells and seems to be of good quality. There are about 500 services in use representing some 2,800 people, or 60 per cent. of the total population. The average daily consumption is 818,000 gallons, most of which will in time reach the sewers.

The surface drainage of the village is led direct to the Cuyahoga River through surface gutters and a few short tile. There are as yet no public sewers for house drainage. The railroad shops, the file works, and the condensed milk factory, together with a number of private houses and blocks have private sewers to the river. From the water works record it is estimated that there are about 60 water closets now in use, some of which, however, drain to cesspools.

In addition to the general need of sewers, resulting from the extensive use of the public water supply, the village now wishes to pave the business streets and properly desires to put in the sewers needed.

Owing to the financial condition of the village it is not deemed possible, by the committee of the council, to put in a complete system at the present time, but they wish to prepare plans for the whole and to put in only a small portion now. For this reason the committee also thinks that if purification is required at once they will not be able to put in even a portion of the system.

From the general character of the locality it seems possible to conduct the sewage by gravity to the lower part of the village at an elevation sufficient for purification. If purification is not required at once all plans for a sewer system should be prepared with this in view as a possibility for the near future.

If it is desirable to allow the sewage to be emptied into the river without purification, the best location of this outlet would no doubt be in the vicinity of the W. & L. E. Railroad bridge across the Cuyahoga River or immediately above it. This place is removed from all residences, but is quite near the file works and the condensed milk factory, and might be objectionable to these parties. If the outfall sewer is carried a few hundred feet below the above mentioned bridge there can be but little chance for complaint even if a nuisance is caused by the sewage, at times.

There are no public water supplies which will be polluted by the admission of sewage to the Cuyahoga River at Kent, at the present time.

Below Plum Creek, which is just below the railroad bridge, the Cuyahoga River has a drainage area of 305 square miles, or 67 square miles per thousand of the population of Kent. With this stream, this drainage area should have run-off enough to dispose of the sewage, in an unobjectionable manner, by dilution.

The local circumstances are peculiar, however, as a short distance above the point of discharge there is a large stone dam which furnishes water power to a flour and feed mill just below. At times the dam holds back the entire night flow of the river for the use of the mill during the day. From the statements of the mill owners, they can run at all times from eight to ten hours per day. Here this means a flow of about 40 cubic feet per second for the time that the mill is running, or about 15 cubic feet per second for twenty-four hours.

If the above statement is correct the stream contains enough water to unobjectionably dispose of the sewage of Kent for the present at least unless the impounding of the night flow should allow the sewage to stagnate to such an extent as would cause a nuisance.

The village owns a tract of land, 6 to 7 acres in area, bordering the river and immediately above the W. & L. E. Railroad bridge. This land seems to have a loam surface with a sand and gravel subsoil and would probably be suitable for sewage disposal. It is objectionable on account of being near the manufacturing district.

For some distance below this point the land bordering the river is low and mucky, and little suited for direct use for disposal purposes.

The village of Kent wishes to be allowed to construct a small portion of its sewer system with an outlet direct to the Cuyahoga River at a point in the general vicinity of the W. & L. E. R. R. bridge, to be approved later.

From all that can be learned the sewage will not cause a serious nuisance and the outlet can be so located so as to be removed from any habitation.

Attention is called to the fact that when the sewage increases in volume the water power at Monroe Falls, about six miles below, may be affected and damages asked for.

If it is thought desirable to allow the sewage to be sent to the river direct it would be well to require that the village authorities prohibit the running of private sewers to the river and to require that all house drainage shall go to the public sewer, wherever it is possible. This will do away with future trouble from this source, and in fact, decrease the nuisance from the sewage of Kent, for some time at least.

At a meeting of the Board, held January 16th, 1901, it was voted to grant permission to the village of Kent to construct sewers and discharge sewage into the Cuyahoga River provided that plans be filed in the office of the Board, showing location of sewers, outlet of sewerage system, and furthermore that the sewage be purified in a satisfactory manner whenever this should become necessary, as determined by the State Board of Health. Notice of this action was sent to the Sewer Commission January 29, 1901.

Up to this time plans for the proposed sewers have not been presented.

REPORT ON PROPOSED SEWERAGE FOR MAUMEE.

At a meeting of the State Board of Health, held in Cincinnati, April 10th, 1901, Messrs. Riggs and Sherman, Engineers, of Toledo, presented plans for a system of sanitary sewers in District No. 1 for the village of Maumee.

The following communication accompanied the plans:

We submit herewith a map of the village of Maumee, Lucas county, Ohio, showing plans for a system of sanitary sewers for District No. 1, which comprises the village of Maumee proper.

What is known locally as Miami, or the Third Ward of the village, lies further down the river entirely separated from the main village, and this section will not require sewerage for some years at least.

We submit also with this a general map showing the Maumee River from Waterville village to Maumee Bay.

The proposed outlet is at the foot of Conant Street, discharging into the Maumee River, through what is known as the "side-cut," an abandoned section of the Miami and Erie canal. The point at which it is proposed to empty into the side-cut is about two hundred feet from the Maumee River. The outlet of the sewer is six and one-half miles by river from the Toledo water works.

The side-cut, into which it is proposed to temporarily make the outlet, is a stream of water about twenty feet in width, having a very rapid velocity, it carrying off the water from the tail races of two mills and the Maumee Electric Light Works, all of which are run by water power taking their water from the canal.

The present village of Maumee was founded in the early part of the century, was graded a city of the second class in 1835, and was for a number of years the county seat of Lucas county. Its present population is about 1,800. In the last two or three years there has been a marked improvement, a number of people moving from Toledo and building homes in Maumee. It is now proposed to build only the section of the sewer from the outlet of the canal on Conant Street, leaving the laterals to be constructed later. The immediate demand for the sewer comes from parties who have constructed a bank and store building about two blocks from the river. There is at present no means of draining cellars in the business section of the town, and at present drainage is urgently needed for cellars.

In as much as there is no water works in the town, and water works are not likely to be established for a year or so, the sewer will carry little if any sanitary sewage; but it is proposed to make a start on the system —

First. To take care of cellar drainage.

Second. To encourage the building of modern houses and putting in of furnaces, and,

Third. To give the Sewer Commission control over the existing sewers so that the present private sewers and one or two exceedingly old village sewers may be abandoned in the near future.

It is the ultimate intention to provide for sewage purification by means of intermittent filtration, using the territory between the side-cut and the Maumee River, southwest of Conant Street. This land lies about ten feet above ordinary water level in the river, and from three to four feet above extreme high water. It has a porous, sandy gravel soil, excellently suited for the purpose.

We therefore ask that you approve the plans with the outlet either into the side-cut or into the river direct. We recommend the side-cut, subject to the condition that when said sewers are used for sanitary sewage to such an extent as to contaminate the water of the river, and make it, in the opinion of the Board, available to establish purification works, that said village will then put in purification works.

We ask for this sort of an order:

First. Because there are a number of private drains now in, which have been in existence for from thirty to seventy years, and as long as they continue to be used will contaminate the river as much as sewers could do.

Second. Because to order sewage purification works now would work a grevious injury to the town, as it is financially unable to build more than a small section at present. The purchase of land and the building of disposal works would prohibit establishing of sewers. The only hope for Maumee is as a residence suburb of Toledo, and no property can be placed on the market to Toledo home seekers unless there is a possibility of putting in cellars and furnaces. There are at present probably not to exceed fifteen houses in the town that have cellars, and not to exceed three or four that have furnaces.

The bonded indebtedness of Maumee is $81,000. The total valuation is $314,530. It will be seen from these figures that the town financially is in a deplorable condition.

Third. We would like to have you permit us to develop the town without placing restrictions, particularly as no action has been taken in the cases of the many private residences and public institutions on both sides of the river between Maumee and the Toledo water works.

In submitting this request we fully recognize the necessity of protecting the Toledo water supply. We do not feel that by granting our request you will in any manner jeopardize this water supply; but on the contrary, we believe you are placing in your own hands and in the hands of the Sewer Commission the means of doing away with a large number of connections, which are at present a greater menace to the water supply, and which are much more difficult to abate by reason of the fact that they are owned by private individuals, and an immense number of suits would be involved to get rid of them otherwise.

We therefore most urgently request that action be taken favorable to our petition.

The board voted to disapprove said plans, and a committee was appointed to investigate the pollution of the Maumee River between the village of Maumee and the intake of the water works of the city of Toledo.

Subsequent to this time a complaint was made to the Board that Maumee was making extensive changes in its sewerage system, such changes not having been approved by the Board. The matter was referred to Dr. W. C. Chapman, member of the Board at Toledo, for investigation and report.

At a meeting of the Board, held November 14th, 1901, Dr. Chapman reported that he had investigated the complaint and that he had learned that the changes being made in the sewerage system of Maumee did not involve a new outlet, but simply the abandonment of an existing sewer which was inadequate, and the construction of a new sewer in its place with no additional sewage to be discharged into the river.

The following communication will explain the action taken by the Board:

COLUMBUS, OHIO, NOVEMBER 16, 1901.

To the Sewer Commission, Maumee, Ohio,

GENTLEMEN :— The attention of the State Board of Health having been called to some changes being made in the sewerage system of your village, the matter was referred to Dr. W. C. Chapman, a member of the Board, for investigation.

At a meeting of the Board, held in Columbus, on November 14, 1901, Dr. Chapman reported upon the proposed changes, supplementing his report with a report and plans submitted by Mr. H. E. Riggs, a member of your Commission.

We understand that this change consists in a relaying of the Conant Street sewer, which is to be placed at sufficient depth to drain cellars in the business section of the village and to take care of storm water of a certain district.

You are hereby notified that the Board, at said meeting, voted to approve of the proposed changes in your sewerage system but with the provision that no sanitary sewage should be admitted to this sewer without the approval of the State Board of Health.

Very respectfully,

By order of the Board. (Signed) C. O. PROBST, *Secretary.*

REPORT ON SEWERAGE FOR PLAIN CITY.

In April, 1900, application was received from the village of Plain City to approve plans for partially sewering said village, the sewers to discharge into Big Darby Creek.

The Engineer was sent to Plain City in March and submitted a report. His report showed that the proposed sewers would be available for from three to five hundred people, and that the drainage area of Big Darby Creek above Plain City was approximately 150 square miles.

The Board voted to approve the plans for said sewers, and notification of this action was duly sent to the Council of Plain City.

Subsequently a petition was received from a number of the residents of Plain City, asking for further investigation, and expressing a fear that the outlet was so located that a nuisance, detrimental to them, might at times be created.

Accordingly another investigation was made and the advice was given that the outlet be carried further down stream, or that some other method for purifying the sewage should be adopted.

In December of 1900, plans were presented for a septic tank system of purification.

These plans were approved by the Board, and under date of January 29th, 1901, the mayor and council of Plain City were notified of this action of the Board.

REPORT ON A PROPOSED SEWERAGE SYSTEM FOR SIDNEY.

At a meeting of the State Board of Health held January 16th, 1901, Messrs. Wagoner and Woodward, members of the Sewer Commission of Sidney, appeared before the Board and requested that they be permitted to discharge sewage into the Miami River without purification for the present. They stated that plans would be prepared at once for a system of sewers for Sidney, but they wished to know in advance whether it would be necessary to provide at once for sewage purification works.

A committee of the Board, that had visited Sidney, reported upon the condition of the river at that point.

The Board voted to approve of a sewerage system for the city of Sidney, with the discharge of crude sewage into the Miami River subject to the condition that plans showing the exact location of the proposed outlet sewer should be filed with the Board for approval, and that the sewage should be purified in a satisfactory manner whenever that should be deemed necessary by the State Board of Health.

At a meeting of the Board held April 10th, 1901, Messrs. Riggs and Sherman, Consulting Engineers, submitted plans and specifications for a sewerage system for Sidney, in accordance with the former action of the Board, and these plans were approved subject to the conditions imposed by the Board at its January meeting.

Notice of this action was sent to the Sewer Commission April 29th, 1901.

REPORT UPON A SEWER FOR WALBRIDGE PARK, TOLEDO.

At a meeting of the State Board of Health held in the city of Toledo, on August 21st, 1901, the City Engineer presented plans for a sewer for Walbridge Park; said sewer to be discharged into Swan Creek. This question had been previously presented to the Board in requesting its approval of a sewer for District No. 36, embracing Walbridge Park.

The Board voted to reaffirm its action of April 29th, in disapproving the plans for the Walbridge Park sewer unless the sewage be purified in a manner satisfactory to the State Board of Health, and the authorities were so notified August 23d, 1901.

REPORT ON PROPOSED SEWER SYSTEM FOR UPPER SANDUSKY.

The following communication was received relative to plans for a sewerage system for the village of Upper Sandusky:

UPPER SANDUSKY, O., JUNE, 25, 1901.

To the Honorable, The State Board of Health of Ohio.

GENTLEMEN: — The village of Upper Sandusky has caused to be prepared a set of plans for a complete system of sewerage, both storm water and sanitary, developing the systems separately so far as practicable without discarding existing sewers and where not practicable then intercepting house sewage from all combined sewers and carrying same to a single outlet where disposal works can be constructed at such time as the State Board of Health may deem necessary.

These general plans for the sewerage of our village are herewith respectfully submitted for the consideration and approval of the Board.

It is proper to state that the village does not contemplate, and has not the funds to undertake any extensive sewer construction at this time, and desires to adopt a plan for a complete system of sewerage only because of the necessity of more intelligently expending in the future than in the past, such funds as may be available from time to time for sewer construction.

The sewer plans will be presented to your honorable body by Mr. Sherman, of Riggs & Sherman, the engineers who designed the system, and he will answer any questions and explain any details of the plans which you may desire.

Respectfully submitted,
The Village of Upper Sandusky,
(Signed) By O. A. HALBEDEL, *Clerk.*

The matter was referred to Dr. W. T. Gemmill, for investigation, who reported as follows:

Having been appointed a committee of one to investigate the proposed sewer system for Upper Sandusky, I visited said village on July 12th, 1901, and in company with the engineer, Mr. Sherman, of Toledo, and the mayor and health officer, carefully considered the site of the proposed plant, which is for sanitary sewage principally, the storm water sewage being allowed to take care of itself, as shown by the plans and specifications.

Upper Sandusky has a population of between 3,500 and 4,000, and a water supply which is at present in an unsanitary condition. They have a little over five miles of sewers with five outlets direct to the river and to two ditches. There are a little over one hundred closets (mostly from the schools and jail) and eight or ten vaults connected with the sewers. The largest sewer on the west side of the village empties into what is known as Juvenal's Run, and this would be dry the greater part of the year except for the sewage turned into it, making it a decided nuisance. This Juvenal's Run is an open ditch considerably overgrown with weeds and is about 2,500 feet long to the outlet into the river. It is proposed to lay a cast-iron pipe in this ditch and cover it over and insure a free outlet to the river which will be one mile north of the village. There are no towns or villages along the Sandusky River using the water nearer than Tiffin, which is thirty-four miles by river from Upper Sandusky. The current of this river is sufficiently rapid during most of the year to carry off all sewage that will be emptied into it.

I enclose herewith a blue print map and blank plans and specifications of the proposed sewerage system and make same a part of this report.

While I do not as a rule approve of admitting any raw sewage into rivers or streams that may be used by any one for domestic purposes, yet in this case and at this time I would recommend that the village of Upper Sandusky be allowed to make such disposition of its sewage as is specified in the plans herewith submitted, with the proviso that at any time the State Board of Health shall deem it unwise and prejudicial to the public health to allow said river to be used as an outlet for the sewage it may require said village to put in a disposal plant and make such disposition of the sewage as the Board shall approve.

The Board voted to approve the plans with the proviso, that if at any time the State Board of Health should deem it unwise and prejudicial to the public health to allow the Sandusky River to be used as an outlet for crude sewage, the village of Upper Sandusky is to put in a sewage disposal plant and make such disposition of the sewage as said Board shall approve.

The village authorities were notified of this action August 12, 1901.

REPORT ON SEWERAGE FOR THE NORTHWESTERN SEWER DISTRICT OF ZANESVILLE.

Plans for sewerage for the Northwestern Sewer District of the city of Zanesville were presented to the Board, accompanied by the following communication:

Zanesville, Ohio, October 16, 1901.

To the Honorable State Board of Health, Columbus, Ohio,

Gentlemen: — I herewith respectfully submit to your honorable Board a plan for the proposed Northwestern Sewer District in this city for your consideration and approval.

The sewers designed purely for sanitary purposes empty at the confluence of the Muskingum and Licking rivers below the dams of both streams.

The storm sewers for surface water, only, discharge above the dam of the Muskingum River, as shown in the plans.

I would also state that this plan has been adopted by the city council, and the necessary legal steps to provide for the creation of the district were necessarily taken in order that the district could be placed on the tax levy of the ensuing year. For this reason the favorable and early action of your honorable Board will be greatly appreciated.

Very respectfully submitted,
(Signed) Henry I. Buell, *City Civil Engineer.*

The plans were considered by the Board, and it was voted to approve them upon the condition that the sewage be carried to the river, and that a submerged outlet be constructed. Notice of this action was sent to the City Council of Zanesville.

MISCELLANEOUS.

REPORT UPON THE CONDITION OF THE WATER SUPPLY OF AKRON.

The following communication received from the City Clerk of Akron, was presented to the Board at a meeting held June 26th, 1901:

Akron, Ohio, June 24, 1901.

State Board of Health, Columbus, Ohio,

Gentlemen: — The following is a resolution passed by the city council of Akron, Ohio, at its regular meeting on June 17th, 1901:

Whereas, the water supply furnished by the Akron Water Works Company has been condemned as unfit for domestic use, based upon an analysis, and the special committee appointed by this council has reported it not fit for use, and,

Whereas, the condition of the health of our city is paramount to all else pertaining to its welfare and,

Whereas, the board of health of our city has wholly ignored this important question, therefore,

Be it resolved, that this council bring to the attention of the State Board of Health the condition of the city water and request that honorable body to investigate it as to its fitness for domestic use. Passed June 17, 1901.

Please acknowledge receipt.

Very respectfully,
(Signed) Charles H. Isbell, *City Clerk.*

Mr. Josiah Hartzell, member of the Board, was appointed a committee to investigate the complaint and report to the Board his findings. Following is a copy of his report.

Preliminary to presenting my observations a brief outline of the features of Akron's water system will be of assistance. Such a brief was prepared for our Board several years ago, and from that I copy the following:

"The water works were put in in 1880 by a private company operating under a perpetual charter. A new franchise, granted in 1893 and extending 24 years, provides for the purchase of the water works by the city. Nothing is said as to the source of the water. The present supply is from wells and Summit Lake. There are 32 wells, six to eight inches in diameter, and from 40 to 100 feet deep, all located in the valley of the 'Cemetery' Run, just southwest of the city. The wells go through hardpan and gravel into a sand in which the water is found. The wells originally flowed, but are pumped by direct suction now, the water being lowered at times to the suction limit. It is estimated that the wells supply about two-thirds of the total amount of water necessary. A 30-inch main from Summit Lake furnishes all the water over and above the well supply. The lake is a portion of the canal system of the State. Its local pollution is due to a couple of summer resorts on its shores, a salt refinery and the surface drainage from the rural population. Its watershed is not large, as it is located very near the State divide. The water flows by gravity from the lake to a pump well, 50 feet in diameter and 35 feet deep, which also supplies some of the ground water itself. Before reaching this well the lake water passes through a small grit chamber, in which all the heavier matter is caught."—From the 13th Annual Report of the Ohio State Board of Health, 1898, page 573.

By personal inspection it was learned that the 32 wells are not pumped at the present time. The water in them rises to the surface and the flow from them is collected and forms a small part of the city supply. The great bulk of the latter comes from the Summit Lake intake. The water in the lake is derived from springs; also from a canal-feeder extending up stream to Turkeyfoot Lake. The course and current of the canal-feeder lies along the side opposite to that in which the intake is located. It is probably due partially to this fact that Professor Bleile, in his analytical report, printed further on, expresses the opinion that the canal water does not enter very largely into the city water supply.

It will be noted that three sources of possible pollution are adverted to in the above statement, viz., several summer resorts, watershed drainage and a salt refinery. So far as the reports are concerned the law confers on the city authorities ample authority for their control, whether inside or outside of the corporate limits. The sanitary policeman assures me that every source of pollution from that quarter is suppressed. As to natural drainage, all surface supplies must receive the surplus rain from the watersheds, unless specially prevented. As these lakes occupy, topographically, a summit position, the pollution from this quarter is necessarily of little significance.

Since the above statement was prepared the salt refinery referred to has been discontinued. Immediately above it, on the canal-feeder connecting Turkeyfoot and Summit Lakes, there is now under construction a salt works of much larger proportions. While the drainage refuse from such works is comparatively small, a wise provision has been made for the conduct of this refuse, by a special iron sewer, directly into the city sewer system.

About a year ago the reclaiming works of a rubber manufactory was built on the edge of the canal-feeder, opposite the salt works, its refuse being disposed of in the canal. An easement of this character, so full of economy and convenience for the industry possessing it, is not apt to be lightly prized. But this course met with a prompt protest from the Akron Water Company. The Ohio State Board of Public Works also took cognizance of the situation, demanding the discontinuance of pollution, and the suppression of all underground connection with the waters of the State. The correspondence between the Board of Public Works and the reclaiming plant, which we publish by request, is as follows:

STATE OF OHIO.

BOARD OF PUBLIC WORKS.

AULTMAN, OHIO, JUNE 3, 1901.

Gen. Manager Diamond Rubber Co., Akron, Ohio,

DEAR SIR: — If your outlet pipes at your reclaiming plant have not yet been raised so the bottom of pipe comes to the surface of water in canal, the sooner it is done the better it will be for all concerned.

No lease for water will be granted until such action has been taken and water returned uncontaminated.

Kindly let me know what action you propose taking in the premises.

Very truly yours,

W. G. JOHNSTON.

THE DIAMOND RUBBER COMPANY.

AKRON OHIO, U. S. A. JUNE 7, 1901.

Hon. W. G Johnston, Pres., Board of Public Works, Aultman, Ohio,

DEAR SIR: — We have your letter of June 3rd and have given it careful attention. Since our last meeting with you the writer has looked over our outlet pipes at South Akron and finds that the level of the land in the lower part of our works is only a very few feet above the canal level. On this account it would be very, very difficult and perhaps impossible to get sufficient fall to drain the pipes, if we raised the level of the outlet at all. In addition to this, it seems to us that you are not treating us quite fairly in asking us to do this. These outlets were put in after receiving permission from you and the work was done with your knowledge and subject to your inspection at the time. We do not know whether or not you had a man on the premises but we remember definitely reporting to you when the work was to be done, in order that you might have the work inspected if it was your desire. It would be quite a costly matter and necessitate some delays in our operations to make this change. We can satisfy you in regard to the quantity of the water returned to the canal very easily, without making this change, and it is always possible to get accurate and satisfactory samples of the liquid discharged, even if the discharge is below the surface of the canal. We have decided, that in order to end all controversy over the matter, it will be best for us to join the salt works in running a sewer to Main Street. We shall probably put in an independent sewer, but if we can make arrangements with them will place it in the same trench as their pipe. Through this sewer we will pump everything but condensing water. That is to say all wash water and drips containing oil. This water is absolutely harmless but if it is generally known that we have a sewer and are using it, it will probably stop this discussion. We think that as these pipes have been placed as they have with your knowledge, that it is unfair to ask us to change them at our own expense, and as we are going to the expense of a sewer, which will amount to some $1,500., we trust that you will be able to waive the other matter.

Yours very truly,

DIAMOND RUBBER CO., A. H. MARKS, *Vice Pres.*

STATE OF OHIO.
BOARD OF PUBLIC WORKS.

AULTMAN O., JUNE 10, 1901.

A. H. Marks, Supt. Diamond Rubber Co., Akron, Ohio.

DEAR SIR: — Your letter of the 7th received and note what you say about complying with my request. I take it you do not propose to do anything with your outlet pipes unless compelled to, which I am sorry to say I will do if you continue to use water, and my request is not complied with.

You speak of pipes having been put in by permission from the State. In reply to that will say the Diamond Rubber Company never had, nor does it now have, permission from the Board of Public Works to take water at their South Akron plant. You went up there, built your works, and when you got ready for water hitched onto the Ohio Canal without permission or authority, after which you put in an application for water as follows: 'For permission to take water from the canal to supply two 250-horse power boilers and for ordinary milling purposes at your plant in South Akron, the water so drawn to be returned to the canal uncontaminated and in undiminished quantities,' after which you called the Chief Engineer and myself in to see what you had already done before the application was acted on by the Board. When we did view it, both of us were under the impression that you were going to use the water for similar purposes, as you do at your other plant. Consequently we gave it but little thought until complaints came to us of contamination, and then it was that we knew that water was used for a different purpose, and consequently a different permit must be entered into.

You speak of putting in a sewer to connect with the city sewer through which you will pump everything but condensing water. How are we to know what proportion of water taken is wasted unless the pipes show? You further say that you think it unfair to ask you to change the outlet pipes at your own expense, admitting that they *can* be changed if the State pay the expense.

Now I do not care to talk about this matter any further. You will have to do as your neighbors have to do, viz., the Colonial Salt Company, bring your outlet pipes to the surface of water in canal at once, or pipes connected with the canal will be ordered taken out.

Very truly yours,

W. G. JOHNSTON.

THE DIAMOND RUBBER COMPANY.
FACTORY AND RECLAIMING DEPARTMENTS.
WALTER B. HARDY, *President.* WILLIAM B. MILLER, *Secretary.*
ARTHUR H. MARKS, *Vice-Pres. & Supt.* ANDREW H. NOAH, *Treasurer.*

AKRON, OHIO, U. S. A., JUNE 13, 1901.

Hon. W. G. Johnston, Aultman, Ohio,

DEAR SIR: — Your letter is at hand. We do not at all agree with you in your statement that we have acted without authority in entering the canal at our South Akron plant. On the contrary, we have not connected a pipe with the water without permission either from you or Mr. Perkins. This is a matter of absolute evidence and record. We do not presume that Mr. Perkins has given us permission to enter the canal at this point without having the requisite authority to do so.

Again you make the statement that we have asked permission to use water merely for two 250 H. P. boilers at our South Akron plant. This is also inaccurate. Our requests from the start and our statements have always been that we were to use water for our boilers and for condensing purposes, and in fact the bulk of the water which we should use was to be for condensing purposes. As we have heretofore stated and as we stated in our application, this water is returned uncontaminated to the canal. This can be proven and nothing contrary to this has ever been proven. Any material which returned to the canal in any condition other that that in which it entered our intakes, did not come either from our boilers or our condensers.

Further in your letter you ask how it can be determined what proportion of the water we take from the canal is returned to the canal, if our pipes are not above the surface of the water. In reply to this, we would say that it is very easy for you to take the diameter of our sewer pipe, which leads up to the city mains. We would be quite willing to show you the pump which operates it and it would be a simple matter to calculate the maximum amount of water that could be wasted. However, we do not propose to carry this discussion further. We have already registered with you our complaint, that you are according us unfair treatment in forcing us to change material, which has gone in with the sanction of the Engineer of your Board, and according to the definite instructions of your letter of the 10th, we shall, as rapidly as it is possible for us to do so, raise the outlets above the surface of the canal and put in whatever apparatus is necessary to lift and discharge the water at this point. We shall either join the Colonial Salt Works in putting down a single sewer to connect with the city sewer, or shall lay one of our own in the same trench, at the same time they place theirs. Any water used for washing purposes will be collected in a cistern by itself and pumped into this pipe. The condenser water, which is probably 95 per cent. of the total amount of water used by us at South Akron, will be returned to the canal uncontaminated and discharged above the level of the canal.

If you have any further requests to make in connection with this plant, we would be very glad to have them at once, in order that the writer may begin work on them before leaving on his vacation. As we have already stated, we wish it distinctly understood that while we are carrying out your request to the letter, we are doing it under protest.

Yours very truly.

Diamond Rubber Company.
A. H. Marks, *Vice-Pres.*

STATE OF OHIO.

BOARD OF PUBLIC WORKS.

Columbus, O., June 7, 1901.

A. H Marks, Vice-Pres. Diamond Rubber Co., Akron, Ohio,

Dear Sir: — Your letter of the 13th received and contents noted.

I had the pleasure of showing your letter to Chief Engineer Perkins last Saturday when in the city. He has also seen my letters in reply to yours in which he agrees with me in every particular.

I do not propose to answer your last letter fully, for it is a waste of time, except this: you ask if I have any further requests to make, saying you would be glad to have them at once. I have no other request to make, but repeat my former request, viz., that you raise your outlet pipes to the surface of water in canal between now and the 1st of July.

Very truly yours,

W. G. JOHNSTON.

Personal inspection afforded by the courtesy of the reclaiming works, revealed the fact that the objectionable refuse (July 12th) was being disposed of on land on the side of the works opposite the canal. Continuance in this practice might be objectionable, but assurance was given that an iron sewer, similar to that of the salt works, and connecting with the city system, was nearly completed and would be used to the exclusion of every other method in the disposal of all objectionable matters. The other promise to the Board of Public Works had already been complied with — the outlet of the water used for condensation purposes having been placed well above the surface. No objection could be made to the apparent character of this water. It is therefore reasonable to believe that the practices of this company will give no further cause of apprehension.

With the advent of hot weather the water from Summit Lake takes on a taste and odor that is decidedly objectionable. The presence in it of organic impurities is unmistakable. The trouble this year being more pronounced than usual, the local board of health renewed its precautions, some of which have already been referred to. Application was also naturally made to the Akron Water Company for a prompt correction of the evil. At a public meeting of the city board of health the president of the company promised that the trouble should be corrected with as little delay as possible, and that the city should be furnished with water of the highest purity and excellence.

In as much as the accomplishment of this expressed determination will require considerable time, and in view of the possible dangers to health arising from the use of the present bad water, the company applied to Professor A. M. Bleile, of the Ohio State University, for a chemical and bacteriological analysis of the water. Under ordinary circumstances the chemist of the State Board of Health would have been invited to make the analysis for this report, but the authoritative reputation of Professor Bleile certainly renders such a step unnecessary in this instance. Professor Bleile's report is as follows:

DEPARTMENT OF PHYSIOLOGY, OHIO STATE UNIVERSITY.

COLUMBUS, JULY 2, 1901.

Mr. Geo. W. Crouse, President, Akron Water Works Co.,

Enclosed is table giving the results of water analysis. The samples were taken June 25th:

EXAMINATION OF WATER FROM AKRON.

PARTS PER MILLION.

Number of sample	1.	2.	3.	4.	5.
Turbidity	slight	none	none	none	none
Sediment	slight	marked	marked	marked	marked
Odor	none	woody	woody	woody—more marked	woody
Oxygen required	1.4	6.8	6.3	5.7	7.1
N. as ammonia free	.148	.054	.247	.083	.16
N. as ammonia albuminoid	.038	.178	.204	.184	.167
Nitrogen as nitrates	.24	.6	.8	.312	.34
Nitrogen as nitrites	trace	.066	.0102	.008	.0044
Chlorine	2.	10.	11.	3.	trace
Alkalinity	195.	115.	115.	135.	130.
Total solids	263.	269.	249.	232.	222.
Loss on ignition	10.	19.	40.	32.	32.
Bacteria per c. c	28.	229.	190.	590.	336.

No. 1, from flowing well at water works;
No. 2, from hydrant at water works and this sample represents the water pumped into the city mains;
No. 3, from gate house, representing the water taken from the lake;
No. 4, from the canal at the rubber reclaiming works;
No. 5; from the canal about two thousand feet above works.

The well water (No. 1) is a very pure water both chemically and bacteriologically considered.

The city water (No. 2) represents a water without objection as far as its chemical and bacteriological composition shows. The chlorine is much higher than in the well water but it is still well within the limits which are usually taken as indicating pollution. It is my belief that this chlorine comes largely, if not altogether, from the soil impregnated with salt. Neither the free and albuminoid ammonias nor the nitrates are beyond quantities frequently found in good waters. The figure for nitrites is to be explained by a reduction of the nitrates taking place in the flow of the water through the iron conduits. The bacterial count does not show a high number nor are there many species present. The colon group of bacilli was sought for with negative results thus showing the absence of pollution by human excrement. The only objection to be offered to this water is the odor. This is due to the vegetable growths and is very common in water taken from smaller lakes, or reservoirs which are exposed to the light.

The lake water (No. 3) presents in a measure the same features as No. 2. It is of course higher in some of its constituents than No. 2 but there is nothing in the analysis again to show pollution of a specific character, and the low bacteriological count and absence of the colon bacteria bear this conclusion out.

The canal water (No. 4) shows the largest number of bacteria and a more marked odor than the other water. The "oxygen consumed" is also higher here. This indicates a pollution at this point which, though not very serious at present, would probably grow in its effects on the water below if long continued.

The canal water farther up (No. 5) is of a character general to waters found in channels with much vegetable growth. The number of bacteria is not high and the absence of colon bacteria again let it pass as without injurious constituents. In my opinion, however, very little of the canal water at the present time reaches your intake pipe.

Respectfully yours,

(Signed) A. M. **Bleile.**

Being now advised, in advance, concerning the probable effect of the Akron water on the public health, it remains to be seen whether the favorable hygienic character given to it by Professor Bleile is sustained in actual experience. An examination of the monthly reports of the health officer of Akron since October (previous reports were destroyed by fire) shows the following record of deaths from typhoid fever: October, 1; November, 3; December, 2; January, 1901, 0; February, 0; March, 0; April 0; May, 1; June, 2. The report shows no deaths from any other water-borne disease except these. It is true that this report is not all that could be desired, for there have been nine deaths, presumably derived, either from the city water or from well water (which in large towns is apt to be the most dangerous of the two) in nine months, when there should have been none at all. Nevertheless, if the easy-going American style of self-justification by comparison is permitted, this mortuary record, in a population as large as Akron's, would give the city a high place, and its water a rather enviable sanitary rating. Practically, therefore, the lesson of the analysis is confirmed by the hygienic history of the city.

The resolution requesting this investigation declared that the unfitness of the water "was based on an analysis." It is to be presumed that the analysis so referred to was one printed in a daily paper which exhibited, in one million parts of water, the presence of the following quantities of the substances named: Free ammonia, .47; albumenized ammonia, .67; nitrites, .04; nitrates, 80; chlorine, 11.3. By comparison it will be seen that this result shows the presence of substances usually derived from contaminating matters in excess of that shown by Professor Bleile in all except the nitrites. In both cases the chlorine (sodium chloride) quantities would constitute a serious indictment of the water if its presence could be traced to sewage infiltration. When it is remembered that there was, for some years, in operation, a salt works on the edge of this water body, and that the vicinity is characterized by the presence of underground salt, this indication loses about all of its insanitary significance. Attached to the analysis last referred to, is appended the following statement which is probably the newspaper's comment and not to be credited to the chemist who made the examination:

"Chlorine is a deadly poison and two parts per million renders water unfit for use." Also; "Chlorine destroys the membranes of the human body, and no membrane is so sensitive as the lining of the stomach."

Accepting these statements as correct, and in view of the large chlorine constituent found by both chemists, one must wonder that a living being is to be found on the town plat of Akron. That they do so live, and enjoy good health as well, is partially due to the fact that the poisonous gas, chlorine, is never found in a free state, — is, in fact, not available outside of the chemical laboratory. The metal sodium has seized upon all the available chlorine and has stored it in the earth and seas in the shape of common salt, a substance that is indispensable to the well-being of mankind.

The chlorine factor in water analyses is important, not because the ordinarily small amount of salt can injure health, but for the following reasons: If this saline ingredient cannot be accounted for by the presence of salt rock, or salt water, in the region furnishing the water supply, then it is a fair inference that the excretions of men or animals using salt have gained access to the water, and contamination is to be feared and provided against.

The talk about the "deadly poison," chlorine, in the Akron water gave rise to much unwarranted anxiety. It had its proper place under the scare-head of a sensational paper.

Reviewing the entire subject one is led to conclude:

1st. That although the present odor of the water is bad — almost as bad as that at Saratoga Springs and some other noted health resorts — there is in it no present menace to health, and

2nd. That the agreement of the Akron Water Company with the local health board to rectify the evil has been made in good faith by responsible parties and will be carried out.

To the "Whereas" of the Council asserting that "The board of health of our city has wholly ignored this important question" it is proper to say that exactly the contrary is true.

This report was approved by the Board, and a copy of it was sent to the City Council of Akron July 30, 1901.

REPORT OF AN INVESTIGATION OF A NUISANCE AT CLYDE.

The Board was requested by the Trustees of Riley Township, Sandusky County, to investigate a nuisance caused by the pollution of Raccoon Creek by the sewage of Clyde. The Engineer, Mr. Flynn, was sent to Clyde October 11th, 1901, and in company with the township health authorities went over the ground. He reported as follows:

Complaint had been made to the trustees that Raccoon Creek received, in passing through Clyde which is in Green Creek Township, such a large amount of refuse that a very objectionable nuisance was caused and the water rendered unfit for stock use for a number of miles below Clyde. Investigation showed that a canning factory and a sour kraut factory send their refuse to a ditch which flows a short distance between the Lake Shore and Michigan Southern Railroad and the Wheeling and Lake Erie Railroad, then empties into Raccoon Creek at the point where the above roads cross the creek west of Clyde. During the daytime this ditch carries only a small amount of rather clear water, but, it is claimed, and conditions as found bear out this claim, that at night when the works are cleaned up there is a large amount of liquid waste emptied into this ditch. Its sides for a considerable distance were covered with a large amount of foul smelling sediment which had been deposited from the waste, and large quantities of the waste were still left in the pools of Raccoon Creek, not having been washed away as yet.

From the Wheeling and Lake Erie bridge to the Clyde sewage disposal works, a distance of nearly half a mile, Raccoon Creek was full of a milky white waste which gives off a very offensive odor. When fresh the liquid smelt strongly of kraut, but as decomposition progressed the odor became very objectionable.

It is claimed that the sewer farm receives the refuse from two other kraut factories, and from the gas works, but their wastes were practically lost in the sewage proper.

At the time of the inspection the Clyde sewer farm was discharging quite a stream of clear but slightly colored effluent which soon mixed with and was lost in the milky waters of Raccoon Creek. This effluent left the characteristic black sediment or growth on the sides and bottom of the effluent channel and gave off some, rather offensive, odor. Of the filtration beds themselves, four of the six were flooded to from 4 to 12 inches with sewage which was in a rather advanced state of decomposition and very offensive. The condition of the plant showed that some little attention had been given it but not the amount that it warranted or required. The beds were designed, it was understood, to act intermittently and no sewage should be standing on the surface of the same, at least not for any length of time. It is claimed that the plant is operated only from April to November and that during the winter season all the sewage is turned direct into the creek. It is also claimed that at times when the beds can hold no more sewage, it is turned into the creek also, even if the latter is in no condition to care for it.

Complaint is also made of the relief outlet just above the works, near Maumee Pike, where the surplus flow of the sewer during rainstorms is discharged into Raccoon Creek. It is claimed that this storm overflow discharges a large amount of refuse from the gas works, which refuse, oil and tar, is deposited, during the high water, on the lowland bordering the creek, destroying the same for pasture use after the creek recedes.

It is claimed that the nuisance in Raccoon Creek is very objectionable for from three to four miles below Clyde, and that at times a nuisance is caused for five or six miles, and that at all times stock will not drink the water for the last named distance. It is understood, however, that the nuisance from the canning factories, etc., is only experienced during the active season, summer and fall.

A short sewer discharging into Raccoon Creek above the sewage farm is also complained of, but nothing was noted at this time to warrant this complaint.

The inspection showed that Raccoon Creek was very objectionable between the sewage farm and the entrance of the waste from the kraut and canning factory, and that the combined waste and effluent from the disposal works polluted the stream for some distance below the latter. It was also noted that the creek below the sewage farm was not appreciably worse than above the same when it received the refuse from the kraut factory, etc., alone. The pollution was of course greater, but it was hidden to the eye, in the more offensive factory waste. Also the creek above the entrance of the factory waste was clear and entirely unoffensive and seemed to be pure as far as the eye could judge.

Chemical samples were taken of Raccoon Creek; No. 1, above all serious pollution, No. 2, below the entrance of the factory waste and above the sewage disposal works, No. 3, the sewage filter effluent, and No. 4, of Raccoon Creek below the sewage works, representing the combined pollutions, and submitted to the Chemist, Mr. Horton, for examination.

REPORT OF EXAMINATION OF WATER FROM RACCOON CREEK AT CLYDE.

PART PER MILLION.

	Creek No. 1.	Creek No. 2.	Sewage effluent.	Creek No. 4.
Number of sample	1918	1919	1920	1921
Color	.20	slight, off	decided, off	decided, off
Turbidity	slight	.40	.68	.55
Sediment	slight	much	much	much
Odor	vegetative	foul	foul	foul
Oxygen required	4.33	47.00	28.11	43.00
N. as ammonia free	.080	6.800	3.620	4.480
N. as ammonia albuminoid	.184	4.080	2.820	2.850
Nitrogen as nitrates	.24	trace?	trace?	trace?
Nitrogen as nitrites	.026	none	none	none
Chlorine	19.8	?	285.5	267.3
Alkalinity	146.	370.	492.	432.
Incrusting constituents	259.	150.	250.	254.
Total solids	1338.	1538.	2212.	1879.
Volatile and combustible	329.	352.	564.	466.

These samples were received October 11th. Examination gave the results as stated above. Some of the determinations could not be made accurately as is usually the case owing to the peculiar composition and the color of the fluids in question.

The water in sample No. 1918, Raccoon Creek above pollution, is not unlike some of the hard surface waters of the state. The analysis shows that the water at this point is not entirely above pollution, but the pollution is so small compared with that which follows as to be of no moment. There is no reason to think this water would not be acceptable for stock use.

The sewage effluent, No. 1920, and the two remaining samples from Raccoon Creek, Nos. 1919 and 1921, are exceptional cases of pollution. All three samples are very foul liquids containing much organic matter, and the analyses are such that I should expect the stream to flow a considerable distance before attaining a respectable condition unless its volume of water is rapidly increased by tributaries.

Raccoon Creek before receiving the sewage effluent is so grossly polluted that even the sewage effluent, bad as it is, causes some of the chemical findings in sample No. 1921 to be lower than in sample No. 1919, but this is the result of dilution not of purification. In this case we have a combination of two very gross pollutions either of which would be a nuisance.

A copy of this report was sent to the trustees of Riley Township, and full instructions given as to steps necessary to be taken for the abatement of this nuisance. A copy of the report was also furnished to the City Solicitor of Clyde.

REPORT OF AN EXAMINATION OF THE SEWAGE DISPOSAL PLANT OF EAST CLEVELAND.

The board of health of Collinwood having requested an investigation of the sewage disposal plant of East Cleveland, claiming the sewage was not properly purified, causing a nuisance by polluting the brook into which it discharged, said brook flowing through Collinwood, an inspection of the works was made on March 12th by Dr. Miller, a member of the State Board of Health, and the Secretary.

The following communication was sent to the board of health of Collinwood:

Columbus, Ohio, March 16th, 1901.

To the Board of Health, Collinwood, Ohio,

Dear Sirs: — In compliance with your request, the State Board of Health has caused an investigation to be made of the sewage disposal plant of the village of East Cleveland, Ohio, the examination having been made March 12th, 1901. At that time there was a slight odor about the plant of the raw sewage, and the purified sewage had a faint musty smell. A sample of the sewage and of the effluent was collected by the committee and has been examined in the laboratory of the Board. I enclose herewith a copy of the report of the chemist. This would indicate that the plant, even at the present time, is effecting a fair degree of purification of the sewage. It is not entirely satisfactory, and this is probably due to the fact that the plant is being over-worked and more sewage being delivered to the plant than it can successfully treat. We are informed that the village of East Cleveland has already issued bonds to materially extend the capacity of the plant which will be done in the near future, and there is reason to believe that this will enable them to satisfactorily purify their sewage and remove all cause for complaint. The committee will recommend to the Board that no further action be taken until after the results of this proposed extension are known.

Yours truly,

(Signed) C. O. Probst, *Secretary.*

The Chemist reported as follows:

The results of the analyses of the samples of sewage and sewage effluent from the East Cleveland plant, received on the 13th instant, are given below. The chlorine determinations indicate that the portion of sewage examined was approximately of the same strength as that which yielded the effluent examined. From the findings obtained the following percentages of efficiency were computed:

For nitrogen as free ammonia	90.0%
For nitrogen as albuminoid ammonia	85.4%
For oxygen required	86.6%

REPORT OF EXAMINATION OF SEWAGE AND EFFLUENT FROM EAST CLEVELAND.

	Sewage	Effluent
Number of sample	1600	1601
Color	.45 off	.18
Turbidity	.35	trace
Sediment	considerable	trace
Odor	sewage	trace musty
Oxygen required	39.16	5.24
N. as ammonia free	16.400	1.640
N. as ammonia albuminoid	3.960	.580
Nitrogen as nitrites	trace	.130
Nitrogen as nitrates	trace	13.46
Chlorine	31.8	30.4

It was recommended that no further action be taken in this matter until after proposed extensions to the plant were made.

APPROVAL OF GARBAGE DISPOSAL WORKS FOR HAMILTON.

The Board of Control of the city of Hamilton presented plans showing the location and construction of garbage disposal works for said city, and asked that they be approved, in accordance with the provisions of an Act to amend Section 2142 of the Revised Statutes, passed April 16th, 1900. (O. L. Vol. 94, page 383).

The plans were accompanied by the following communication from the President of the Board of Control:

HAMILTON, OHIO, JUNE 5TH, 1901.

To the State Board of Health, Columbus, Ohio,

GENTLEMEN: — I send you with this mail a blue print map of the city of Hamilton, showing the location of the proposed City Crematory. It can be easily reached by all wagons hauling garbage, and does not molest any citizen. On the south and west of the lot is a stone quarry, on the north a gelatine factory, and on the east the Miami River. We intend to build a crematory somewhat similar to that at Dayton and Youngstown, in which the odor is destroyed in the chimney by an intense fire. We will burn only garbage (kitchen offal) and dead animals. No night soil will be permitted in the furnaces. That will be disposed of as at present. We must now dump our garbage on the ground which makes it very offensive and injurious to health. We kindly request your honorable body to grant us permission to build a crematory on the place selected. The citizens almost unanimously voted for the bonds and approve of the site chosen by the Board.

Awaiting an early and favorable reply, I remain,

Yours sincerely,
(Signed) Joseph J. Pater, *President.*

The plans were examined by the State Board of Health, at a meeting held June 27th, 1901, and it was voted to approve them. Notice of this action was sent to the Board of Control of the city of Hamilton, June 29th, 1901.

REPORT OF AN INVESTIGATION OF TYPHOID FEVER AT HIRAM.

Hiram is a village of 659 inhabitants on the Erie Railroad in Portage County. Hiram College, with an attendance of from 300 to 400 students, is located there. The town is well situated for good surface drainage, and is kept in a commendably clean condition.

At the request of the College authorities the Secretary of the State Board of Health, on August 6th, 1901, visited the village to investigate a recent outbreak of typhoid fever. The following facts were learned:

College commencement exercises were held on June 20, 1901. A number of visitors from a distance were present. On June 13th a reception was given, which was attended by many who were afterwards stricken with the fever. On the afternoon of commencement day the Alumni Banquet was held, and was also attended by many who subsequently developed typhoid fever.

The first case occurred June 25, the last July 25. The following table shows the dates on which cases occurred, counting the beginning of the case as the day on which fever was first noted:

June.	No. of Cases.	July.	No. of Cases.	July.	No. of Cases.
25	1	4	4	14	3
26	1	5	1	15	1
27	2	6	4	16	1
28	2	7	1	17	1
29	3	8	1	18	1
30	3	9	3	22	1
July.		10	1	22	1
1	4	11	1		
2	3	12	1	Total	46
3	0	13	1		

Information was received of forty-six cases, apparently belonging to this outbreak: two of these were fatal. There were a few other cases for which information was not obtained. Twenty-two of the patients lived at Hiram, and twenty-four in other Ohio towns. The youngest patient was 8 years of age, the oldest 60. Five were under 20; twenty-eight between 20 and 30; five were between 40 and 60 years.

As some question was raised as to the character of the disease (six of the cases were diagnosed as malarial or typhoid-malarial fever, the others as typhoid fever), blood drops were taken from twelve of the patients and subjected to the Widal test with the following results:

Laboratory No.	Name of patient.	Widal reaction.
8	E. L. H.	Positive.
9	L. E. McL	"
10	F. R.	"
11	M. F.	"
12	A. D.	"
13	J. E.	"
14	—— McD	"
15	A. W.	"
16	Mrs. W.	"
17	G. H. C.	"
18	Mrs. G. H. C.	"
19	L. F.	"

The reaction in cases 10 and 12 was a little delayed. In case 19 "while the reaction was positive it was not so marked as in some of the previous cases."

While the Widal reaction is not an infallible diagnostic, it fails in probably not more than four to five per cent of cases examined. The average duration of fever in thirty-six cases for which this information was obtained, was 23 days. The longest period was 42 days, the shortest 3 days. (This case was diagnosed as malarial fever.) In twenty-three of the thirty-six cases the fever lasted three weeks or more. It may be confidently stated that the outbreak was one of typhoid fever.

The explosive character of the epidemic, all the cases occurring within thirty days, indicates a temporary source of infection to which all, or practically all of the patients must have been exposed. Typhoid fever is not endemic in Hiram, the last case to occur there previous to the present outbreak having been two years or more ago.

The village is supplied with water by two springs located about a mile from the college and discharging to a collecting well from which the water is pumped to a standpipe for distribution. The supply was introduced in 1897, and is now quite generally used. There was no reason to suspect this supply to be infected, and an inspection of the springs and surroundings revealed no sources of pollution.

A sample of the water was taken from the collecting well, from each of the springs, and from a street hydrant near a dead end. The water had been standing in this dead end about three weeks when the sample was taken. Following are the results of the examination of these four samples:

REPORT OF EXAMINATION OF WATER FROM HIRAM.

PARTS PER MILLION.

	Hydrant east end.	Spring 1.	Spring 2.	Collecting well 3.
Number of sample	1804	1805	1806	1803
Color				.05
Turbidity				none
Sediment				none
Odor				none
Oxygen required				.32
Ammonia free				.030
Ammonia albuminoid				.106
Nitrogen as nitrates	3.63	4.48	3.68	4.37
Nitrogen as nitrites	.010	none	none	none
Chlorine	1.3	1.6	trace	1.1
Hardness temporary				47.
Hardness permanent				12.
Total solids				111.
Bacteria per c. c.	7100.*	24	70.	17.

*(Chiefly one species) Intestinal bacteria not found.

"The results show the reservoir water to be a mixture of the two spring waters. The nitrates might be lower, but, with the other findings as shown, have little significance. These are potable waters. No. 1804, hydrant extreme east end: The large number of bacteria was probably accidental as they were chiefly of one species. The nitrites are unfavorable but it should be remembered this sample was taken from an unused hydrant and the water had been standing for some time."

The history of the epidemic and the results of the examination render it practically certain that the public water supply was in no wise responsible for the outbreak.

There was a suspicion in the minds of some that in some way typhoid fever was disseminated at the Alumni Banquet. Eleven of the forty-six patients from whom reports were received were not present at the banquet. One of the patients was taken ill five days after the banquet, one six days after, and six within eight days thereafter. It is scarcely possible that this very exceptionally short period of incubation should have been present in such a large proportion of the cases.

Hydrant water was used at the banquet (Note statement further on that well water was also served there.) The hydrant water, for reasons given above, has already been excluded as the cause of the epidemic. All the evidence is opposed to the theory that the epidemic could have started from the banquet.

The milk supplied to practically all the villages is obtained from a dairy kept by very careful, cleanly people. There was no typhoid fever in this dairyman's family. The preponderence of cases was among non-residents of Hiram, who would be least exposed to infected milk, so that milk may be fairly excluded as the cause of the outbreak.

There remains to be considered the college well, located upon the college campus. This well is not in constant use. It was closed during the winter, but was opened June 14th, and again closed July 6th, 1901. It is a dug well 15 feet deep. The soil is clay mixed with boulders and sand, down to a shelly sandrock, forming the bottom of the well. There is a stone cap protecting the well against surface drainage, and there is a cemented sewer pipe laid up in the well-hole. An iron pump pierces the stone cap. The nearest dwelling to the well is about 150 feet and the well is about 200 feet from the nearest privy. The privies are usually without vaults.

One of the physicians of Hiram, who formerly lived near to and used this well, stated that three or four years ago a quantity of manure was placed on the campus about 300 feet west of the well. After a heavy rain the well gave evidence of manure pollution as shown by both taste and odor. In the street west of the campus there is an outcrop of sandrock. Professor Colton says "The rock outcrop on the west side of the campus is at least 17 feet above the surface of the rock in the college well." The dip of the rock is therefore favorable to pollution coming from the west. In the spring of 1900 two flower beds, one 30 and the other 60 feet from the well, were heavily manured. There was no evidence that this had polluted the well, at least as regards taste or odor of the water.

Samples of water taken from the well were examined with the following results:

REPORT OF EXAMINATION OF WATER FROM HIRAM.

PART PER MILLION.

Number of sample	1802 Campus well
Color	.12
Turbidity	very slight
Sediment	slight
Odor	none
Oxygen required	.59
N. as ammonia free	.266
N. as ammonia albuminoid	.048
Nitrogen as nitrates	6.88
Nitrogen as nitrites	.003
Chlorine	17.5
Alkalinity	29.
Incrusting constituents	12.
Total solids	157.
Volatile and combustible	23.
Bacteria per c. c.	475.*

* No colon found.

"The findings show that this water at the time of sampling was a subsurface water which had received some filtration, but the findings for free ammonia, nitrates, nitrites, and the number of bacteria are suspicious for a well of this character. The nitrates and chlorine are such as show past pollution and with the rest of the analysis place the well under grave suspicion, although at the time of sampling intestinal bacteria were not present in the water."

It is possible that they may have been in the well and not in the one sample (2 ounces) examined. It is also possible that typhoid bacilli had gained access to the well, but had perished by the time the sample was taken. The viability of this germ in water is uncertain, and is doubtless shorter in some waters than others.

From the chemical side the well shows evidence of pollution. The negative evidence from the bacteriological side does not exclude it as the possible cause of this outbreak of typhoid fever. If condemned it must be largely from circumstantial evidence. This may now be examined.

The well was opened June 14th. The first case of fever occurred eleven days thereafter. The incubation period of typhoid fever is a variable one. From 14 to 16 days is perhaps an average period. In rare cases it may be not more than one week, and in others as much as four weeks, or according to some observers, even longer. The first of the Hiram cases used water from the college well, and it was possible, therefore, as regards time, for him to have been infected by this water. The well was closed July 6th. The last case of fever began July 25th, 19 days thereafter. It was also possible for this case to have been caused by the well water.

In order to positively incriminate the well it would be necessary to show that all, or practically all of the patients drank its waters. The public water supply is warm, in summer, and the well water was preferred for its freshness. It was carried to the rooms of many of the students, and to other houses in its neighborhood. It was used on the table at Bowler Hall, where a number of persons took their meals. It was also used at the O. B. reception, held on the evening of June 17th. There was a report by one of the helpers at the banquet that the ice water (hydrant water) having become exhausted during the alumni banquet, water was carried from the campus well, unbeknown to the person in charge of the banquet. One of the chief helpers at the banquet, however, who was present all the time, states that it is quite certain that no well water was used.

Professor Colton kindly undertook an inquiry as to how many of those who had typhoid fever drank water from the campus well, or had an opportunity to do so. Of the 46 cases investigated 17 state positively that they drank from the well; 13 others, who state that they did not attend the O. B. reception where well water was served; 4 who did not drink from the well nor attend the O. B. reception took meals at Bowler Hall where well water was used. Thirty-four of the 46 patients therefore, drank or had an opportunity to drink the well water.

Of the 13 who attended the O. B. reception, two were taken ill 13 days thereafter; two 14 days, three 17 days, one 18 days, one 22 days, one 23 days, one 29 days, and one 38 days thereafter. Remembering the incubation period of typhoid fever, it is seen that it was possible for all but one (possibly two) of them to have contracted typhoid fever there, assuming the well to have been infected. Of the 12 other patients 4 do not know whether they drank from the well or not. All but one of these attended the alumni banquet. As already stated, the evidence at present is against well water having been used at the banquet. As the well water was carried to many of the houses in the village, it is at least possible that it was used by patients who did not have access to it at the well, reception or Bowler Hall. Three of the out-of-town cases are of interest owing to their short exposure to infection. Two of these lived at Welshfield, and were in Hiram only from 4 p. m to 11 p. m. on June 20th. They attended the alumni banquet, but so far as they know did not drink water from the college well. One was taken ill July 6th, 16 days after the banquet, and the other not until July 22; thirty-two days thereafter. This would be an extraordinary long period of incubation. It is not impossible, considering the time, that this second Welshfield case was contracted from the first one, as the two were friends, having come to the banquet together. The third case to be referred to was a patient living in Ravenna. He was in Hiram for the alumni banquet, and remained there thirty-six hours. He did not knowingly drink the college well water. Evidence favorable to the well not being the cause of the outbreak is, that of sixty-eight regular borders at Bowler Hall, where water from the campus well was served, only two had typhoid fever. *Furthermore,* on June 27th a Sunday-school class of a dozen girls, from 12 to 14 years of age, held a picnic near the well, and all of them drank freely of its waters. None of these had typhoid fever. In considering negative evidence of this kind it is to be remembered that it is the history of all outbreaks of typhoid fever that where a large number of persons are exposed to a single source of infection, such as a polluted water or milk supply, the great majority are unaffected.

Summing up all the evidence obtainable it can only be said that the burden of proof is in favor of the college well having caused the epidemic of typhoid fever at Hiram.

Grateful acknowledgement is here made of the great assistance received from Prof. G. H. Colton in collection of facts relating to this case.

REPORT OF AN INVESTIGATION OF AN ALLEGED NUISANCE IN HOCKING TOWNSHIP, FAIRFIELD COUNTY.

Complaint was made by residents of Hocking Township, Fairfield county, of a nuisance caused by the Seymour Tanking Works, located in the township, and the Board was asked to assist the local health authorities in securing its abatement. Accordingly the Engineer, Mr. Flynn, was sent to Amanda, September 7, 1901, and in company with members of the township board of health made an investigation. He reported as follows:

The nuisance complained of consists of a reduction or knacking establishment located about one mile east of Amanda and near the Zanesville and Maysville pike. The works are owned by the Seymour family, who also operate a similar concern in Circleville.

Dead animals, principally horses and cattle, are gathered in for more than ten miles around and treated at the works. The hides and grease, are sent to a Dayton firm and the bones and tankage, it is claimed, are disposed of to Washington C. H. parties.

As soon as the animals are skinned the carcasses are dumped into a large boiler and cooked with steam until the bones are freed from the flesh and the latter reduced to a pasty mass. The grease is skimmed off, the water drained out, and the tankage spread out to dry. It is claimed that from 20 to 40 animals are treated in a month.

The most objectionable and far-reaching odors, it is claimed come from the boiling process. The waste water which is turned out onto the ground and drains to a dry ditch, is also very objectionable. The ditch is full of a very foul-smelling putrefying mass for a number of yards from the plant, and it is claimed that in times of rain the refuse is washed down to the farms below causing a serious nuisance and rendering the ditch water unfit for use.

The work is done in an old barn provided with no facilities for keeping clean and the whole place is saturated with filth. A large quantity of the bones and tankage is stacked up near the works and much more scattered promiscuously around, all giving off very foul odors.

At times, it is claimed, the dead animals are held for a few days until enough are gathered for a tank full, but it is also claimed by the operators that they are cooked daily. At one time, it is also claimed, a large number of animals were covered over, with sawdust, in a shallow trench and left until the bones rotted out.

The establishment is within 100 yards of a side road, 200 yards from a very important pike, and within 300 to 400 yards from three dwellings. It is claimed that the stench from the works is intolerable to the occupants of the three houses and every one compelled to pass over either of the roads.

The condition of the place at the time of inspection certainly bore out this claim.

It is a question whether this business can be conducted without causing some nuisance, but it is certain that the present nuisance can be greatly lessened by proper methods and care. The cooking could be done in a closed vessel provided with an apparatus for deodorizing the escaping gas.

The work of preparing for the tanking could be done in a closed building provided with impervious floors and plenty of water. All the products could easily be stored in tight receptacles until removed. It is of course impossible for this business to be conducted on so small a scale and provide all the proper facilities, but it is certain that ordinary cleanliness could be secured together with better boiling facilities and proper storage facilities.

The reduction plant has been in operation for some three years, during which time there has been constant complaint regarding it. The township trustees have visited the place three times, and have ordered the nuisance abated to the extent that a general cleaning up would give. Some improvement has been effected, it is claimed, but there is certainly room for a great deal more, as the place is at present in a very filthy and objectionable condition, and is causing a serious nuisance.

A communication was sent to the township health authorities giving them proper instructions as to steps that should be taken to abate this nuisance.

REPORT OF AN INVESTIGATION OF THE WATER SUPPLY OF LANCASTER.

Complaint having been made that the water supply of Lancaster was subject to dangerous pollution, the Board ordered an investigation, and the chemist and engineer of the Board visited Lancaster and reported upon their investigation.

The water supply of Lancaster was investigated by the Board on two previous occasions, and both times the attention of the authorities was called to the existing sources of pollution. It is interesting to note that in spite of these conditions natural purification has kept the water at most, if not at all times in potable condition.

The report of the engineer and chemist is as follows:

On July 5, 1901, Lancaster was visited and the water supply investigated in company with Doctors Stukey and Harmon, and the secretary of the Water Works.

The inspection brought out no new features, the conditions being practically the same as shown by the reports of 1897 and 1898. The gallery from which the water supply is obtained is subject to the same danger of pollution as was described in the above mentioned reports.

The sewer which formerly crossed the gallery and emptied onto the low lands just adjoining has been extended and now empties into the

Hocking River, but this line together with the other one which was previously extended to the river, is of very poor construction and must allow some of the sewage to seep out onto the low land over which the sewers are laid. The construction of these tile sewers across the filter gallery is certainly a very unsanitary piece of work, as they are a constant menace to the purity of the gallery water.

As was formerly reported, garbage and refuse of all kinds is still dumped near and over the filter gallery.

The practice of using wells for cesspools is still practiced in the city, causing a serious pollution of the ground water, some of which must of necessity be drawn into the filter gallery.

The so-called "Mill Spring" is about 70 feet from the end of the gallery but it is claimed that the gallery drains the same. Owing to the fact that the river was high from recent rains and over the site of the gallery in places, it was impossible to determine as to whether or not the spring was flowing.

The fact that the gallery is flooded by the river is also an objectionable feature as the river water receives much refuse from sewers and slaughter houses above. The connection between the river and the gallery is more intimate than desirable, as shown by the turbidity of the gallery water when the river is up.

In summary, it may be said that the conditions as found are very unfavorable for the collection of potable water, but the chemical analyses seem to show that the water is probably well purified before reaching the gallery. It does not seem possible, however, that the gallery will continue for an indefinite time to supply a potable water with the opportunities for pollution existing as they do.

It is certainly advisable that the city either prevent further pollution of the present supply, or seek a supply from a source removed from pollution.

The present supply could be protected to a considerable degree by constructing an intercepting sewer in the bed of the abandoned canal, above the gallery, and diverting all the sewage to a point below the water works. All dumping over and near the gallery could be prevented and the refuse now present cleaned up. A dike or levee could be constructed along the river front to keep out the flood flows, or the low land bordering the gallery could be filled in with clean earth or gravel. It is stated that the water works trustees intend to fill in over the gallery to some extent. It is further necessary to construct such sewers as are needed and prohibit the use of all vaults and cesspools unless the same be absolutely water-tight.

With the above conditions carried out there would probably be but little danger to the water supply. If they cannot be carried out it would seem advisable to secure a new supply in the near future.

REPORT OF EXAMINATION OF WATER FROM LANCASTER.

PARTS PER MILLION.

	Pumping well.	Surface water.	Beck well.	Groff well.
Number of sample	1739	1740	1741	1742
Color	.28	...	...	...
Turbidity	.35	.55	none	none
Sediment	slight	decided	trace	none
Odor	earthy&veg.	vegetative	none	none
Oxygen required	3.23	16.38	...	...
N. as ammonia free	.058	...	...	...
N. as ammonia albuminoid	.204	...	...	...
Nitrogen as nitrates	4.00	.18	21.60	15.07
Nitrogen as nitrites	.010	.018	.006	.016
Chlorine	31.0	16.9	74.0	41.0
Alkalinity	268.	167.	...	...
Incrusting constituents	40.	6.	...	...
Total solids	531.	382.	...	...
Bacteria per c. c.	37200.*	...	...	...

*Colon bacilli not found.

	Brewery well.	Benadum well.	Nourse well.	Hydrant water.
Number of sample	1743	1744	1745	1746
Color	...	...	...	.10
Turbidity	none	none	none	none
Sediment	trace	none	none	trace
Odor	none	none	none	faint oily
Oxygen required	...	...	...	1.36
N. as ammonia free	...	...	...	.007
N. as ammonia albuminoid	...	...	...	.092
Nitrogen as nitrates	trace	18.66	13.33	3.15
Nitrogen as nitrites	.016	none	none	.001
Chlorine	53.2	64.1	24.8	31.9
Alkalinity	...	...	...	261.
Incrusting constituents	...	...	...	24.
Total solids	...	...	...	490.
Bacteria per c. c.	...	...	...	1400.*

*Colon bacilli not found.

These samples were collected at the time of our investigation. The sources of the samples and their laboratory numbers are a follows:

1739. Well at pumping station.

1740. Surface water over the gallery at time of sampling due to the high state of the Hocking River after heavy rains.

1741. Well at M. Beck's, on Forest Rose Ave. Depth of well 26 feet.

1742. Well at T. Groff's, on Forest Rose Ave.

1743. Well at The Becker Brewery Company's plant. 51 (?) feet.

1744. Well at J. Benadum's, on Forest Rose Ave. A deep dug well.

1745. Well at Mrs. Emma Nourse's, on Mulberry St. (Good surroundings.)

1746. Hydrant at wash-room in Hocking Valley depot.

The depth of several of the wells could not be learned, but they were probably from 20 to 40 feet deep. Some of the samples were collected in small bottles and therefore the amount of water was not sufficient for a complete analysis in each case, but there was water enough in each case to make the important determinations.

In view of the various preceding investigations of the water at Lancaster, and the more or less lengthy reports from the same, it would be a mere repetition to go into details at this time, since this investigation substantiates the previous findings, viz:

1. The city wells are thoroughly polluted with sewage more or less oxidized.

2. The city wells show greater pollution from sewage than does the water of the public supply.

3. Part of the gallery water is derived from the subsurface drainage of the city, and part from the surface or subsurface water of the low land between the river and the canal.

4. That portion of the gallery water derived from the subsurface flow of the city is in its present degree of purification usable but it is certainly undesirable, and is a menace to public health.

5. As long as the surface or subsurface water of the low land continues to be polluted with sewage, so long will it be an undesirable adjunct to the city water.

6. In times of high water there is a far more intimate connection between the gallery and the surface water than is desirable or safe.

In connection with the last statement it might be said the present investigation furnished the analytical data to show such was the case, whereas at previous times it was only indicated because the river was not at a high enough stage to furnish direct evidence. In justice to the operation of the waterworks it should be said that no water was being pumped from the gallery at the time of this high water, which was the proper course since the water in the well and gallery at the water works was inferior in quality to that obtained from a tap in the city.

A copy of this report was sent to Dr. Stukey, Health Officer of Lancaster, and to Dr. G. A. Harmon, July 31, 1901.

REPORT UPON A NUISANCE AT LONDON.

At the request of the Health Officer of London, an investigation was made of a nuisance caused by the discharge of sewage into an open ditch within the city.

The following communication was sent to the Board of Health of London, under date of December 10, 1900:

At the request of your Health Officer, the State Board of Health caused an investigation to be made of an alleged nuisance in your city caused by turning sewage into an open ditch, which does not carry water enough to remove offensive matter. This ditch, near where it crosses Main Street, brings in the drainage from some sixteen houses and a church, all of them provided with water-closets, also waste matter from other houses not supplied with modern conveniences. There is no doubt that a very considerable nuisance exists of a public character which ought to be abated. The report of the Engineer shows that there is more or less cause for complaint in other parts of the city on account of lack of sewerage. The fact that London has had a public water supply for some ten years and that it is in quite general use, makes it highly desirable that a general sewer system should be installed. The nuisance complained of can scarcely be abated in any other way. The advantages of a general sewer system are so great as regards both health and convenience that it is a matter of some surprise that a city of the enterprising character of London should have been so long without them. We should be glad to see your board interest itself in the matter of securing a sewerage system for London.

REPORT OF AN OUTBREAK OF SICKNESS AT LORAIN SUSPECTED TO BE DUE TO THE DRINKING WATER.

Letters and telegrams were received from the board of health of Lorain in reference to a sudden and widespread outbreak of sickness suspected to be due to the drinking water.

The secretary visited Lorain, March 11th. The Jewell Filter Company had constructed works in connection with the filter plant at Lorain for the manufacture of a solution of sulphate of iron to be used in place of alum as a coagulant in the filtration of the water supply. The use of the iron was begun February 9th and a few days thereafter sickness developed among a number of water users. Dr. Baumhardt, a member of the Board of Water Works Trustees, estimated that one thousand cases had occurred.

The symptoms, as given by Dr. Garver of Lorain, who treated a number of cases, were as follows: "Griping pain in abdomen, frequent bowel movement, sometimes nausea and vomiting; generally elevation of temperature for a short time. In some temperature sub-normal, extreme thirst noted in some cases."

The development of these cases so soon after the change in the water supply pointed strongly to the water as the cause of the trouble.

The chemist was sent to Lorain on March 19th to study the character of the water. He reported as follows:

REPORT OF EXAMINATION OF WATER FROM LORAIN.

PARTS PER MILLION.

	Clear well.	Hydrant Lake Street.	Filter No. 2. Effluent.	Intake.
Number of sample	1602	1603	1604	1605
Color	.10	.16	....	....
Turbidity	trace	trace	none	decided
Sediment	trace	trace	none	considerable
Odor	none	none	none	earthy
Oxygen required	7.04	6.62	....	....
N. as ammonia free	.067	.048	....	....
N. as ammonia albuminoid	122	138	....	....
Nitrogen as nitrates	.40	.42	....	none
Nitrogen as nitrites	none	none	none	4.0
Chlorine	trace	trace	3.8	70.
Alkalinity	56.	50.	....	....
Incrusting constituents	81.	69.	....	....
Total solids	207.	191.	....	....
Volatile and combustible	74.	59.	....	....
Iron	.3	3	....	....
Colon present	yes	yes	no	yes

	No. 2. Effluent.	Filter house tap.	Combined effluent.	Intake.
Number of sample	1611	1612	1613	1614
Color	.13	.13	.12	.17
Turbidity	none	none	none	.14
Sediment	none	none	none	slight
Odor	none	none	none	faint
Oxygen required	6.40	5.29	6.85	2.43
N. as ammonia free	.018	.008	.007	005
N. as ammonia albuminoid	.100	.066	.063	.118
Nitrogen as nitrates	.18	.17	.16	.16
Nitrogen as nitrites	none	none	none	trace
Chlorine	none	none	none	6.0
Alkalinity	49.	71.	73.	81.
Incrusting constituents	84.	58.	62.	29.
Total solids	183.	197.	171.	152.
Volatile and combustible	48.	79.	58.	54.
Iron	.25	.25	.35	1.4
Dissolved oxygen	8.55	8.96	7.68	11.38

Samples 1602-1605 were collected by the Secretary, March 11.
Samples 1611-1614 were collected by the Chemist, March 20.

No. 1602. Filtered water from the clear well.
No. 1603. " " " Lake Street hydrant.
No. 1604. " " " filter No. 2, which has just been washed.
No. 1605. Unfiltered " " the intake well.

No. 1611. Filtered water from filter No. 2.
No. 1612. " " " tap in filter house.
No. 1613. " " " combined effluents.
No. 1614. Unfiltered water from the intake well.

Before discussing the character of the water and its possible bearing on the sickness at Lorain, it is well to look at the bacterial findings obtained by Mr. Patton from daily samples of the raw and filtered waters. The following figures were copied from Mr. Patton's record (except some of the figures for the number of bacteria in the effluent which were obtained by calculation from the efficiency and the number of bacteria in the raw water). The results previous to January 15th were not copied.

Date.	Bacteria per c. c. in raw water.	Bacteria per c. c. in effluent.	Percentage of efficiency.
Jan'y 15	745	36	95.18
16	707	13	98.21
17	487	15	96.99
18	970	10	98.97
19	723	33	95.49
20	2047	44	97.86
21	1950	36	98.16
22	2495	22	99.10
23	3573	15	99.59
24	2230	42	98.12
25	1021	7	99.35
26	1231	34	97.19
27	2653	64	97.62
28	6200	107	98.28
29	1660	17	99.00
30	1310	19	98.58
31	891	18	97.98
Feb'y 1	291	8	97.37
2	1523	7	99.57
3	1440	12	99.16
4	371	4	98.93
5	309	4	98.71
6	2346	22	99.06
7	2588	15	99.42
8	2427	8	99.65
*9	647	18	97.22
10	6378	4516	29.20
11	7091	537	92.43
12	8720	697	92.01
13	9372	543	94.20
14	1533	111	92.77
15	1353	76	94.34
16	3527	137	96.12
17	3837	396	92.89
18	5484	428	92.20
19	285	73	74.39
20	391	90	76.99

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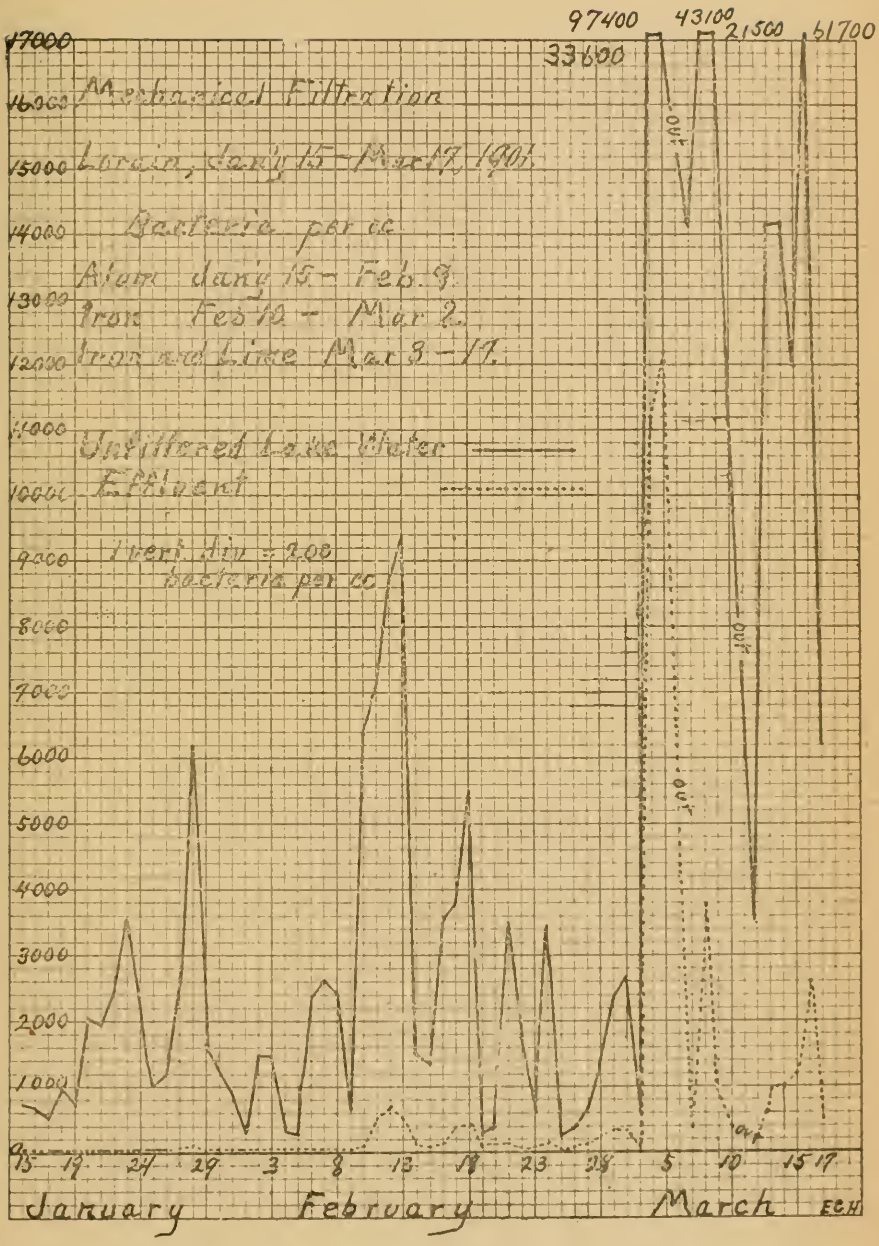
* At 4 P. M. began to use iron for a coagulant in place of alum.


Mechanical Filtration
Lorain, Jan'y 15 – Mar 17, 1901.
Bacteria per cc
Alum Jan'y 15 – Feb. 9.
Iron Feb 10 – Mar 2.
Iron and Lime Mar 3 – 17.
Unfiltered Lake Water
Effluent
Vert. div = 200
bacteria per cc
17000
16000
15000
14000
13000
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
97400
33600
43100
21500
61700
out
out
out
out
15
19
24
29
3
8
13
18
23
28
5
10
15
17
January
February
March
ECH

Date.		Bacteria per c. c. in raw water.	Bacteria per c. c. in effluent.	Percentage of efficiency.
Feb'y	21	3481	114	96.73
	22	1720	57	96.69
	23	610	77	87.38
	24	3500	163	95.35
	25	243	36	84.78
	26	418	41	90.20
	27	750	90	88.00
	28	1287	240	81.35
M'ch	1	2353	377	83.98
	*2	2685	355	86.88
	3	613	47	92.34
	4	33567	11190	66.64
	5	97440	12180	87.85
	6	....	....	....
	7	14132	399	97.17
	8	43133	3778	91.24
	9	21466	962	95.53
	10	11267	394	96.48
	11	....	....	....
	12	3530	236	90.77
	13	14150	968	93.16
	14	14200	1008	92.90
	15	11967	1216	89.84
	16	61666	2620	95.79
	17	6233	530	91.50

* In the evening the use of lime was commenced with the iron.

That the work of the filters was faulty after February 10th is shown by the above bacterial findings as well as by comparison of the chemical findings of the filtered and unfiltered samples. Colon bacilli and other intestinal bacteria were present in the filtered samples 1602 and 1603, as might be expected after considering the above table.

Without saying that the intestinal organisms in the filtered water were the sole cause of the epidemic at Lorain, it must be admitted that they were capable of producing much disturbance in the alimentary canals of a people accustomed to a pure water. As near as the writer could learn the first and most serious outbreak of the trouble occurred about February 12th to 15th. There was some indication of a second outbreak in March but definite evidence was not obtained from the physicians. Iron as a coagulant was first put in use on the evening of the 9th of February, when the wind began blowing from the east, and thus causing the sewage from Black River to come toward the intake. The bacterial efficiency of the filters fell to 29.20 per cent. on the 10th of February and there were over 4,500 bacteria in the filtered water. On succeeding days the effluent was somewhat better, but the number of bacteria in it again became high in March. A second factor may have been the presence of chemical substances in the effluent. In the samples of water we noted the presence of sulphites, thiosulphates, and sulphates. These are present in the iron solution also. The operator says the iron solution was admitted without much control for the first few days, and it is hard to tell to what extent the above mentioned substances may have been present in the filtered water, and whether they may not have at least predisposed the intestinal canals and thus aided in the trouble.

Therefore it would seem that the outbreak of the epidemic followed the introduction into the service pipes of an effluent which contained many bacteria from the lake when sewage from Black River was passing the intake. And in addition this effluent probably contained, as it did later, substances of doubtful desirability and in uncertain quantities.

In considering the recorded results of the sanitary examinations certain points are worthy of mention.

INFERENCES WITH CHLORINE DETERMINATION.

Chlorides were found by the usual process in but one of the effluents (1604) and that was from an individual filter just after washing. The remaining five samples of filtered water showed no chlorine by the usual test, because, as was subsequently shown, something was present that interfered with the reaction. If this is not borne in mind the results would mislead one to think the chlorides had also been removed by the iron process.

INCREASE OF OXYGEN CONSUMING POWER.

The high oxygen consuming power of all the effluents is also misleading if not understood, for it does not mean a corresponding increase in the organic matter in the water. Over 50 per cent. of the result obtained in samples 1611, 1612 and 1613 was due to chemical action, and should be omitted if the oxygen requirement is to be taken strictly as a measure of the carbonaceous material. With the omission the results show no such decrease as we should expect to result from a proper filtration.

No claim is made that the findings for dissolved oxygen are exact ones as they were obtained at the laboratory from shipped samples, but the sampling bottles had been filled to overflowing so that no air space remained above the water in transportation. However, the determinations correspond fairly well with those for oxygen consuming power, but like them are modified by chemical action and cannot therefore receive full weight in their usual interpretation.

TASTE.

While the physical properties were improved by filtration there was an exception in the case of taste, since the effluents at times left in the mouth a very distinct and quite persistent sulphurous taste.

EFFECT ON HARDNESS.

The decrease in the carbonates (alkalinity) and the increase in sulphates (incrusting constituents) was expected but the increase in total solids is not in keeping with the claim of softening the water (which I believe the process is represented to do).

CHEMICAL INEFFICIENCY COMPARED WITH THE QUINCY PLANT.

On samples taken March 12, 1900 from a similar plant at Quincy, Ill., Dr. A. W. Palmer* found the filtered water showing reductions of 91.3 per cent., 75.0 per cent. and 88.2 per cent. respectively for the total solids, oxygen required, and nitrogen as albuminoid ammonia. The Lorain samples show an increase of the total solids and oxygen consuming power of the filtered water, while the average of the three samples of March 20th show a reduction of less than 36 per cent. in the nitrogen as albuminoid ammonia. This comparison shows that the process at Lorain is as yet faulty and not yielding the quality of effluent it might. To be sure the raw water at Quincy is much worse than that at Lorain but the contrast between the efficiencies is too great to make it necessary to consider the point named.

In order to more readily compare the result at Lorain with those usually obtained by filtration the following summary is made:

Determination.	Effect expected from filtration.	Effect obtained at Lorain.
Taste	Tasteless	Sulphurous
Oxygen required	High percentage of decrease	Increased
N. as albuminoid ammonia	High percentage of decrease	Decrease of 36 per cent.
Chlorine	No effect	Determination interfered with
Total solids	Decrease	Increased
Bacteria	High and constant efficiency	Uncertain efficiency and only once up to 97 per cent

The above is not condemnation of the iron process only as it is in operation at Lorain, and the results there can certainly be improved upon when the plant is so arranged as to be run on more definite plans and with less guess work.

In support of the preceding statement the following items are added:

PROPORTION OF SOLUTIONS.

The amounts of the solutions used could be determined fairly well for each 24 hours, but there was no certainty that the *rate* at which they were introduced was constant during the 24 hours, as there was evidence that the *rate* did vary.

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*"Fire and Water" Aug. 11, 1900, p. 43.

The lime solution was in part controlled by the extent to which a particular valve was opened. To force the solution into the pipe feeding the filters a rotary pump driven by pressure of the city water was employed. The pressure was said to fluctuate considerably, and the volume of lime solution did because it depended on so many factors, some of which it is not necessary to mention here. With an undue amount of lime used there would be danger of an excess of lime in the effluent. Dr. Baumhardt had made tests for caustic lime in the water as delivered to the city and had on a few occasions found an excess of lime i. e., the water possessed a caustic alkalinity. He reported that on one day (either March 14th or 15th) the water gave a decided reaction in the morning and continued to do so until nearly evening. In this connection attention is called to the possibility of such a water attacking lead pipes, and if continued leading to lead poisoning. An excess of lime should be guarded against.

The iron solution was supposed to run into the suction pipe of the engine by gravity and was controlled by a valve. There was a discrepancy here for with the valve set at any given point the amount of iron solution varied with the amount of suction but not in proportion to the amount of water pumped. To illustrate, with the pump making a certain number of strokes, a definite amount of iron solution would be added, but if the number of strokes were increased one-third it meant one-third more water was being pumped and to maintain the right amount of iron it should also have increased one-third, but by measurement the iron was found to have increased only one-fifth. During the first few days the iron coagulant was in use iron was noticeably present, and presumably it was present until the use of lime was begun. At the time of sampling no iron of moment was present in the effluent. Between the dates of March 11th and March 20th the daily amount of iron solution used had been decreased 47 per cent., while the lime had been decreased in amount 52 per cent.

STRENGTH OF SOLUTIONS.

One of the operators stated that it was his opinion that the iron solution varied much in quality, and he also stated that five-sixths of the sulphur was wasted.

The lime was supposed to be a saturated solution, but with the addition, by guess, of half a barrel of lime to one of the lime tanks daily, and the tank filled and emptied four times, it would appear that there was opportunity for variation in the amount of $Ca(OH^2)$ in the different washings. Again the proposed reduction of one-half in the cost of operating the filters by the new process as compared with the use of alum was based on a lime containing 85 per cent. of available CaO. A sample of the lime in use March 20th was brought to the laboratory and by analysis was found to contain but 41 per cent. of CaO computing all the lime as CaO, but the calcium was not all in the form of oxide as shown by its failure to slack and by its violent effervescence with the addition of HCl.

Samples were taken by the writer on the 19th and 20th for quantitative bacterial examination with the following findings:

Lab'y. No.	Source.	Bacteria per c. c.	Reduction	Efficiency.
1609.	Intake well	13,200	....	....
1608.	Clear well	500	12,700	96.21
1610.	Tap in health office	1,100	12,100	91.67
1615.	Intake well	4,400	....	....
1616.	Clear well	475	3,975	90.34
1617.	Combined effluent	230	4,170	94.77

COMPARISON OF BACTERIAL EFFICIENCY.

From the table of bacterial results obtained by Mr. Patton it is seen that in the last 26 days that the alum process was in use there were but three times that the precentage of removal fell below 97 and they were 95.18, 96.99 and 95.49. Only once did the number of bacteria in the effluent during that period rise above 100 per c. c., while the average number in the filtered water was only 24 per c. c. The amount of alum used ranged from 1.11 to 2.49 grains per gallon.

In the 34 days the iron had been in use the percentage of removal reached 97 per cent. but once (97.17) and ranged from that down to 29.20. The number of the bacteria in the filtered water varied from 36 to 12,180 with an average of a little over 1,300.

To sum it up in a sentence is to say that the construction and operation of the filtration plant at Lorain was still too much in the experimental stage to warrant accurate and uniform results.

Later it was learned that cases of a similar character were occurring at Elyria. The health officer reported that a disease they called "winter cholera" had been very prevalent in Elyria and surrounding country. Of the one hundred inmates of the County Infirmary, forty had the disease. Symptoms, "pain, griping, watery stools, vomiting, fever, etc."

In Elyria well water is used for drinking, also at the Infirmary. The health officer stated that in most of these cases the sickness preceded or followed an outbreak of lagrippe.

Dr. Garver of Lorain said "in the majority of the cases of 'winter cholera' I have attributed the cause to lagrippe affecting the stomach and bowels."

The "Cleveland Leader" for March 22d, reported a number of similar cases in Cleveland. Dr. Ashmun is quoted as saying that the bad condition of the city water had something to do with it, though the weather might be the cause of it. Dr. House is quoted as saying that he believed sewage in the drinking water was mainly the cause of the trouble, though he said "it generally follows the grip."

It appears that the cases at Elyria, and probably at Cleveland, were of the same character as those at Lorain, and if this be true the change in the drinking water at Lorain could not have caused the trouble. It may be stated in this connection that Lorain expects to conduct a thirty days' trial of the filters with the use of iron and lime as coagulants, and if the claims of the filter company are sustained the State Board of Health will be asked to approve this change in the water supply of Lorain. The filter company claims that the expense for coagulants will be reduced fifty per cent. and the efficiency of the filters be equally as good as when alum was used.

REPORT OF THE INVESTIGATION OF A NUISANCE AT MANCHESTER.

A communication was received from the Secretary of the board of health at Manchester, reciting a resolution of that board, asking the State Board of Health to send a representative there to assist the local health authorities in the abatement of a certain nuisance, caused by a pond of stagnant water. Dr. Stanton, who was appointed a committee to make the necessary investigation, visited Manchester on October 5th, 1901, and made the following report:

The Farmer's Co-operative Milling Company has a steam grist mill within the corporate limits of the village, water for which was formerly obtained from a pond about 40 by 90 feet in size, about 3 feet deep at the edges and 6 feet in the center. The source of supply for this pond is a limited amount of storm water from the streets and not from the damming up of a flowing stream. Two or three years ago a well was driven to a depth of about 85 feet, which now supplies all of the water needed for the mill, and since the use of the well began some leakage from the pumps finds its way to the pond but the amount is very limited. There is no outlet from the pond, so there is no loss of water except by evaporation. The water is foul and is said to have a very offensive odor in summer time. The pond is made a place of deposit for dead cats and dogs. Two houses are within fifty feet, two others within one hundred feet and several others within a few hundred feet of the pond.

It is claimed by the officers of the milling company that they need the water for a reserve in case of the failure of the well, but it is admitted by them that an emergency that would call for the use of the pond water has seldom arisen and has not existed during the present year.

The well that now supplies the mill cost about $100, and could be duplicated for less than that amount. The supply of water seems to be inexhaustible and could only be interferred with by failure of the machinery or tubing of the well. A second well would remove all danger of being left without an ample supply of water.

Interrogation of those living near the pond and of doctors and others who would be likely to have knowledge of the character and amount of sickness in the neighborhood brought out rather conflicting statements, but the testimony of all not interested in the mill was that the pond was a source of sickness. Malarial troubles are said to be more prevalent in that part of the village. But even if sickness cannot be attributed to the presence of a pond of stagnant water, it is an eye-sore and in summer time cannot but be a rank offense to the noses of those living near the place.

In my opinion it is a nuisance that ought to be abated, and I would recommend that the State Board of Health urge the local board to persevere in its efforts to secure its removal, and render such assistance as is in its power to the local board.

A copy of this report was sent to the health authorities at Manchester October 22, 1901.

REPORT OF AN INVESTIGATION OF THE SANITARY CONDITION OF THE ROSS COUNTY INFIRMARY.

A complaint was made to the Board that the sanitary condition of the Ross County Infirmary was not good owing to defects in its sewerage and method of sewage disposal. Dr. Frank Warner was appointed a committee to make an investigation. He visited the institution on August 23rd, 1901, and made the following report:

The infirmary building is of brick, four stories high, and contains eighty-four rooms.

At present ninety-seven people are being cared for; but the superintendent informs me that one hundred and thirty-five is the average number.

One wing of the building, or rather the second and third stories of one wing are used as a Children's Home, in which there are twenty-five children cared for at this time.

They still care for a few insane patients at the infirmary.

The infirmary is situated seven miles from Chillicothe, and the building is perhaps 2400 feet from the Scioto River. The farm upon which the institution is located contains 361 acres.

The water which supplies the house is obtained from a well in the rear of the house. It is first pumped into tanks, two in number, located on top of the house.

There are seventeen water-closet connections in the house, all supplied with flush tanks. Some of the plumbing is not in the best condition, but this will likely soon be corrected. The house was immaculately clean from top to bottom.

The sewage is disposed of by conducting it to a cesspool which is located about 1000 feet from the house. This cesspool has no outlet. Of necessity, the sewage standing in this cesspool becomes very offensive, and when the wind is in the direction of the house the odor, which finds entrance through the open windows and doors, is very decided.

I recommend that this cesspool be abandoned and that they seek an outlet for their sewage into the river. There is plenty of fall to give the sewage some form of land treatment before reaching the river.

I also recommend that the infirmary trustees be requested to have plans drawn up and submitted to our Board for consideration and approval.

A copy of this report was sent to the superintendent of the infirmary, and he was advised to bring the matter to the attention of the Infirmary Directors.

INVESTIGATION OF AN ALLEGED NUISANCE ARISING FROM THE POLLUTION OF ROSS RUN CREEK BY SEWAGE OF CINCINNATI AND NORWOOD.

On October 29th, 1900, the board of health of the village of Bond Hill, Hamilton County, requested the State Board of Health to make an investigation of the pollution of Ross Run Creek by sewage from a trunk sewer of the city of Cincinnati and the village of Norwood.

The Secretary made an investigation and reported a serious pollution of Ross Run Creek by sewage of both Cincinnati and Norwood. The following correspondence will fully explain the action taken in reference to Cincinnati:

OFFICE OF CHIEF ENGINEER, BOARD OF PUBLIC SERVICE.

CINCINNATI, O., JANUARY 12, 1901.

Honorable Board of Public Service,

GENTLEMEN: — In pursuance of reference of the following communication:

COLUMBUS, NOVEMBER 26TH, 1900.

To the Board of Public Service, Cincinnati, Ohio,

DEAR SIRS: — Complaint was made to this Board by the board of health of Bond Hill, Ohio, of a nuisance in said village caused by the discharge of sewage into Ross Run Creek by the city of Cincinnati and the village of Norwood.

I investigated this alleged nuisance on November 16th. The discharge of the Woodburn Avenue sewer into Ross Run Creek is undoubtedly the cause of a serious nuisance, detrimental to public health and comfort. We trust your Board will take the necessary steps to have this nuisance abated at the earliest time practicable.

Very respectfully,

(Signed) C. O. PROBST, *Secretary.*

And in further pursuance of the following report thereon by Clark W. Davis, M. D., Health Officer of the Board of Public Service, to-wit:

The Honorable Board of Public Service,

GENTLEMEN: — I herewith respectfully report on the communication received from the Secretary of the State Board of Health, concerning the complaint made by the board of health of Bond Hill of the nuisance caused by the discharge of sewage matter in the Ross Run Creek by the city of Cincinnati and the village of Norwood. I have investigated this alleged nuisance, and, by careful examination, I find that all the sewage north of McMillan Street and the east side of Main Av., Avondale, drain into a trunk sewer. The mouth of it is on the extension of Woodburn Avenue in the hollow just east of Main Avenue, Avondale, and about two squares south of Hopkins Avenue bridge. The villages of Idlewild, Ivanhoe and Norwood all drain into this — the Bloody Run Sewer — that crosses Montgomery Pike in the hollow of the German Protestant Cemetery, Walnut Hills, as you see by the plat.

The proposition to abate this nuisance is for the city of Cincinnati and the villages of Idlewild, Ivanhoe and Bond Hill to extend this trunk sewer to some point into the Mill Creek, which I respectfully recommend.

Very respectfully,

(Signed) CLARK W. DAVIS, M. D., *Health Officer.*

I have the honor to explain the situation and to present a plan for relief:

The sewer complained of is what is generally known as the Bloody Run sewer. It begins at Ashland Avenue and McMillan Street; thence extending north in Ashland Avenue to Lincoln Avenue; thence east on Lincoln Avenue to opposite the east line of the German Protestant Cemetery; thence northward along the east side of the cemetery to the north east corner; thence northwest in the valley of Bloody Run Creek crossing Gilbert Avenue at the depression directly east of Beresford Avenue, and Blair Avenue at the junction of Rockdale Avenue; thence continuing northwest in Rockdale Avenue to the angle in said avenue about a half mile east of the Reading Road; thence northeast in nearly a direct line crossing Woodburn Avenue and discharging into the run or creek directly east of Woodburn Avenue at a point about 500 feet south of Williams Avenue, having a total length of about 13,300 feet.

The sewer has a diameter of 10.4 feet at its present outlet, 9.16 feet at Blair Avenue, 8 feet at Gilbert Avenue, and 6 feet at Lincoln Avenue. It is throughout a storm water sewer, draining principally the territory between the Reading Road on the west and Woodburn Avenue and the Montgomery Road on the east, embracing portions of Walnut Hills, Avondale and adjacent villages.

The sewer, as already stated, now terminates in Bloody Run directly east of Woodburn Avenue. An extension of 2300 feet is contemplated and can be advertised for proposals as soon as a small portion of the right of way is obtained by condemnation, which will occur in a few weeks. This extension will take the sewer to a point in Bloody Run 370 feet north of Hopkins Avenue. The diameter at the outlet will be 12 feet; storm water and sewage being provided for to this outlet. I advise the construction contemplated but against the continuance of storm water conduit beyond this point.

The drainage area to this outlet is about 2000 acres. Allowing for 50 persons to the acre would give a possible future population of 100,000 people for this drainage area. Allowing 60 gallons of sewage per person per day and one-half of this discharge in 8 hours of the 24 hours, would require a sewer not exceeding 30 inches in diameter with the gradient obtainable from this point towards Mill Creek. The present discharge of sewage into Bloody Run does not exceed the product of a population of 10,000.

From the proposed terminus of this storm water sewer 370 feet north of Hopkins Avenue by the way of Bloody or Ross Run is about 15,000 feet and the area drained is about 2000 acres, making a total area drained to Mill Creek by this tributary of about 4000 acres. This will require a sewer for sewage alone, based on the ratio of population and water use as before mentioned, of not exceeding 3½ feet diameter at Mill Creek. The proposed outlet into Mill Creek will be temporary as without doubt intercepting sewers along Mill Creek will soon be constructed to convey the sewage of this valley to the Ohio River or to future purification plants.

A storm water sewer over this course would increase in size, from the proposed outlet near Hopkins Avenue (12 feet diameter), to about 20 feet diameter at Mill Creek. The approximate cost I estimate as $450,000 exclusive of right of way which would probably be given. The necessity for the storm sewer is not sufficient to warrant the outlay.

I recommend the construction of a small sewer for sewage and a small amount of rain water in addition for flushing.

The approximate size that I recommend is 4 feet diameter at the Hopkins Avenue end and 5½ feet at Mill Creek. When the combined rain water and sewage exceed the capacity of this sewer, the overflow to take the natural creek channel.

When this overflow occurs the volume of sewage mingled with the storm water will not contaminate it to any perceptible extent. The cost of the small sewer recommended will be about $120,000 exclusive for payment of right of way.

I suggest that surveys, plans and estimates, be ordered with a view to extending the sewer in Bloody or Ross Run, from a point 370 feet north of Hopkins Avenue to Mill Creek, in the manner recommended.

I attach hereto a map showing sewer constructed, portion of sewer referred to as nearly ready to advertise for proposals, and course of Bloody or Ross Run to Mill Creek.

Respectfully submitted,

(Signed) N. J. Stanley, *Chief Engineer B. P. S.*

June 24th, 1901, the Board of Public Service of Cincinnati submitted plans for Sewerage for Division 13 and part of Division 14 of the city of Cincinnati, designed to abate the nuisance herein referred to. Dr. Byron Stanton, of Cincinnati, was appointed a committee to investigate and report. Following is a copy of his report:

The application of the Board of Public Service of Cincinnati for permission to construct sewers in Sewerage Divisions No. 13 and No. 14 having been referred to me for report, I would respectfully present the following:

These districts are in the eastern part of the city along the river and about two miles above the intake of the Cincinnati Water Works. The sewers will discharge into Crawfish Creek sewer, permission to construct which was given the city by the State Board of Health January 20th, 1897, subject to these conditions: "That no connections for house drainage, water-closets or vaults shall be permitted without consent of the State Board of Health." This condition was imposed because of the proximity of the outlet of the sewer to the intake of the water works.

An inspection of the districts which it is proposed to sewer shows that that part of the city is very much in need of sewers for storm water. The streets running parallel with the river are so nearly level that in many places water stands in the gutters until it becomes very offensive and this condition can only be avoided by the construction of sewers. It is my opinion that if the sewers, when constructed, were used for storm water only no detriment to the public water suppliy would result. Indeed, I believe it would be both a local and a general benefit to make the sewers so that the water would run off before the organic material that it contains undergoes decomposition if the conditions imposed in regard to Crawfish Creek sewer could be made applicable to the proposed sewers and could be enforced, but the conditions in regard to Crawfish Creek sewer have been disregarded, house connections with the sewer having been permitted by the city without the consent of the State Board of Health.

While believing that storm water sewers in the sewerage districts referred to are greatly needed by the inhabitants of those districts, the prevention of contamination of our water supply should prevent the construction of sewers into which house sewage finds entrance above the intake of the water works. I can, therefore, only recommend the approval of the submitted plans on the following conditions:

(a). That the conditions imposed in regard to the construction of Crawfish Creek sewer, viz: "That no connections for house drainage, water-closets or vaults shall be permitted without consent of the State Board of Health" shall apply to the proposed extensions, and

(b). That some guarantee shall be given by the Board of Public Service that no permits shall be given for house connections without the consent of the State Board of Health.

The Board voted to approve the plans for sewerage for Cincinnati as presented, upon the following conditions: "That no connections for house drainage, water-closets or vaults shall be permitted without the consent of the State Board of Health. This approval is to take effect upon the receipt of a written agreement on the part of the Board of Public Service that no permits shall be given for house connections with said sewers without the consent of the State Board of Health." This action was taken at a meeting held August 21st, 1901, and notice was sent to the Board of Public Service of Cincinnati, August 23rd, 1901.

Following is a copy of a resolution of the Board of Public Service of Cincinnati, agreeing to said conditions:

A RESOLUTION in regard to Connections with Sewers in Sewerage Divisions Nos. 13 and 14.

Whereas, the Board of Public Service of Cincinnati has submitted to the State Board of Health plans for the proposed construction of sewers in sewerage divisions Nos. 13 and 14 of the city of Cincinnati, and said State Board of Health has voted to approve said plans upon the condition "that no connection for house drainage, water closets or vaults shall be permitted without the consent of the State Board of Health," said approval to take effect upon the receipt by said State Board of Health of the written agreement of the Board of Public Service that no permit shall be granted for house connection contrary to said conditions; now, therefore,

Be it resolved by the Board of Public Service of the city of Cincinnati, That said condition be and the same is hereby agreed to, and that in accordance therewith, upon the construction of said sewers, no permit be granted for connection therewith "for any other purpose than for draining surface water in said district until otherwise provided by the Board of Health of the State of Ohio."

Be it further resolved, That a copy of this resolution duly certified be transmitted to the State Board of Health in accordance with their approval hereinbefore referred to.

Notice was sent to the Council of the village of Norwood with reference to the pollution of Ross Run Creek by sewage from that village. Following is a copy of a letter received from the Clerk of the village:

NORWOOD, OHIO, DEC. 9TH, 1900.

Dr. C. O. Probst, Secretary State Board of Health, Columbus, Ohio,

DEAR SIR: — Your letter under date of November 26, 1900, relative to a complaint made about the discharge of sewage into Ross Run Creek was duly presented to council in session on the 3rd instant. I was instructed to respectfully advise you that the matter will receive attention.

Respectfully yours,
(Signed) W. E. WICHGAR, *Corporation Clerk.*

REPORT UPON THE VENTILATION OF THE STATE HOUSE.

A new system of ventilation having been adopted for the Capitol Building, namely, a system of fans for forcing pure air into and extracting foul air from the building, the State Board of Health was requested, upon the completion of the work, to report upon the efficiency of the system.

An examination was accordingly made, and the following is a copy of the report that was submitted:

Ohio State Board of Health,
Office of the Secretary,
Columbus, May 3rd, 1901.

To the Heating and Ventilation Commission, Capitol Building, Columbus, O:

Sirs: — In accordance with your request an investigation was made on the 2nd instant to determine the value of recent changes in the system of ventilating the Capitol building. As it was necessary that the report should be made without delay it was not feasible to examine each office room. This, it is believed, however, was not necessary for the purpose.

The following rooms were examined: Private office and general office (Land Department) of the Auditor, office of Inspector of Workshops and Factories; office of Building and Loan Association and general office of the Insurance Commissioner; waiting room of the Governor; office of the Adjutant General; general office of the Secretary of State, and the rooms of the State Library and House of Representatives.

At the time of the examination both fans were in operation, and all windows and doors were closed, to represent, as nearly as possible, winter conditions.

In each of the offices named, except in two or three instances, the quantity of air entering and leaving the room by the air ducts was measured. No account was taken of the window ventilation, but, as stated, the windows were closed.

Certain office rooms were examined to determine the degree of purity of the air, as represented by the amount of carbonic acid present. These rooms were: The private office of the Auditor, the two offices already mentioned in the Insurance Department, and the Adjutant's office. With the exception of the Auditor's office these are the rooms that are ordinarily most crowded.

The out-of-door air at the intake was also examined for carbonic acid.

The results of these examinations are shown in the following table:

Room.	Area.	Capacity with full height.	Capacity with height 14 feet.	Normal Population.	Mean maximum population.	Cubic feet fresh air per hour.	Times air is changed per hour.	Cubic feet of air per person per hour.	CO_2 per 10,000.
Auditor of State (Private Office)	624	9,984	8,736	2	4	34,320	3.5	8,500	2.74
Auditor of State (Land Department)	1,096	17,540	15,340	6	8	27,660	1.6	3,450	...
Workshops and Factories	390	6,240	5,460	6	8	20,220	3.2	2,530	....
Insurance Department (General Office)	668	10,780	9,445	6	8	42,900	4.0	5,360	4.52
Insurance Department (Building and Loan)	390	6,240	5,460	6	8	40,680	6.5	5,080	4.84
Adjutant-General	1,037	16,592	14,518	10	12	47,700	2.9	3,980	2.99
Secretary of State (General Office)	1,008	16,120	14,110	10	12	38,640	2.8	3,220	....
Governor (Executive)	1,155	18,480	16,170	4	8	28,620	1.6	3,580	....
State Library	4,510	126,280	63,140	10	25	203,100	1.6	8.120	....
House of Representatives	5,173	144,840	72,400	200	300	312,120	2.2	1,030	....

Authorities on ventilation are in practical agreement that for rooms occupied daily the air should be changed often enough to provide each occupant with 3000 cubic feet of fresh out-door air per hour; and this should be done without the creation of unpleasant currents of air.

In some of the rooms examined it was found that the fresh air was shut off, in whole or in part, because of such draughts. These offices should be provided with screens, arranged so as to deflect the incoming air towards the ceiling.

Outdoor air usually contains about three parts of carbonic acid in 10,000 parts (by volume). We found 2.40 parts per 10,000 in our examination of the outdoor air. In any occupied room in which the carbonic acid does not range above 6 or 7 volumes in 10,000, the ventilation must be considered good.

It will be seen by reference to the above table that with the exception of the office of Workshops and Factories and the hall of the House of Representatives, more than the required 3,000 cubic feet per hour per capita was being supplied. In the office of Workshops and Factories the damper in the fresh air duct was partly closed at the time the examination was made. When this damper is opened there is too much draught. A properly arranged screen would permit of a sufficient amount of fresh air being supplied to this office.

In the hall of the House of Representatives there was but 1030 cubic feet of fresh air per capita per hour, based on a mean maximum (which was estimated) of 300 occupants. It is to be feared that the ventilation of this hall will not be at all times satisfactory. One fresh air duct is out of use, having been set aside as a flue for the Treasurer's office. This is for the purpose, I am informed, of permitting the night watchman to have a fire in cold weather. It is highly desirable that this fresh air duct be used for increasing the supply of fresh air for the room in question.

The amount of air passing through the two ventilating stacks was 4,245,340 cubic feet per hour. The estimated capacity of the entire building, exclusive of corridors, which are not connected with the ventilating stacks, is 1,046,488 cubic feet. This would give a complete change of air for the building as a whole four times per hour.

The figures for the carbonic acid present in the air of the offices examined show equally good results. In none of them was this found up to 5 parts per 10,000.

The examination shows that the present system of ventilation is capable of supplying an adequate quantity of fresh air to all the rooms examined, except, possibly, the hall of the House of Representatives, and it may probably be safely assumed that equally good results may be obtained in rooms which, from lack of time, were not examined.

Very respectfully yours,

(Signed) C. O. PROBST, *Secretary.*

REPORT UPON AN ALLEGED VIOLATION OF QUARANTINE IN SMALLPOX IN ROYALTON TOWNSHIP, CUYAHOGA COUNTY.

It was alleged that the trustees of Royalton Township, Cuyahoga County, allowed electors, who were quarantined on account of smallpox in their families, to leave their homes and mingle with voters, enter the booth and vote, to the great danger of the public health.

The Secretary visited North Royalton on November 20th, 1900, and made an investigation of the charges. The following facts were established:

A man by the name of Louis Best, who had been working for a family by the name of Roy, went to the house of Charles Veber, as a laborer, the latter part of October. He was taken sick on or about November 1st and a diagnosis of smallpox was announced on Saturday, November 3rd. On Sunday, November 4th, a house was constructed near North Royalton and the patient was removed to this on the evening of the 4th. On the 5th of November the health department of South Brooklyn sent a man to disinfect the house and contents with formaldehyd. The disinfection was carried on on Monday and finished early Tuesday morning, and included the entire house and contents, with clothing of inmates. After this disinfection was completed Mr. Charles Veber went to the polls on election day to vote. Objections were made, however, to his entering the voting booth. Mr. Veber then called upon Mr. Joseph Turney and Mr. Horace Edgerton, members of the township board of health, and was authorized by them to enter the voting place and vote, which he did.

On the morning of election day Dr. R. F. Hamblin, of North Royalton, went to visit the family of Mr. Roy, of Royalton Township, and as he reached the house John Roy and John Stewart, the latter a boarder, were leaving it. Dr. Hamblin stated that he had visited the Roy family once or twice before election day and found a patient there with premonitory symptoms of smallpox, but as no eruption had developed prior to election day he was not able to positively know the character of the disease. At his visit on election day, after John Roy and John Stewart had left the place, he made a diagnosis of smallpox. He then drove to his office and found Roy and Stewart awaiting him. He told them that there was smallpox at the Roy house and sent them home. He then reported the case of smallpox to the township board of health and the house was at once quarantined.

In regard to Charles Veber, one of the electors who voted, the evidence seems clear that on that day his house, clothing and person were free from infection, and that there was no danger in permitting him to enter the voting place and vote.

In regard to John Roy and John Stewart, the other electors in question, the evidence shows that at the time they voted smallpox had not been reported to the board of health as present in the house in which they resided, and therefore such house could not have been quarantined.

The testimony of Joseph Turney and Horace Edgerton and J. Wiltshire, members of the township board of health, and of S. W. Thomas, clerk of such board, was taken, and also that of Mr. F. W. Voorhees, one of the judges of the election, and a Dr. E. H. Shildrick, the attending physician in the case of Louis Best, and Dr. R. F. Hamblin, the attending physician in the Roy family.

From the best evidence obtainable it appears that the board of health of Royalton Township are guilty of no blame in having permitted Louis

Best, John Roy and John Stewart, the persons referred to in the charges made, to vote on election day.

No other cases of smallpox developed in the Veber family, which was released from quarantine November 19th. Six cases developed in the Roy family, which was still under quarantine at the time this investigation was made.

EXAMINATIONS

MADE IN THE

LABORATORY

OF THE

Ohio State Board of Health

During the Year 1901.

WORK OF THE LABORATORY.

Following will be found an account of the various examinations made in the Laboratory of the Board during the year ending December 31, 1901. The work has been done by Mr. Elmer G. Horton, Chemist and Bacteriologist, in charge of the Laboratory, and his assistant, Mr. Homer D. Williamson.

The Laboratory has now been removed to the new state house building. No appropriation was made for fitting up the new quarters for laboratory purposes, and the work is being done under some difficulties.

Most of the examinations made in the Laboratory were in connection with the investigation of the condition of public water supplies taken from Lake Erie and the Ohio River. These are fully set forth in a special report published as an appendix to this report.

The total number of examinations made during the year was 1319. The nature and results of the examinations are given in tabular form further on.

The expenses during the year were:

Salaries	$2,560.00
Apparatus, supplies, and incidentals	323.82
Securing gas, water and shelves for new laboratory in State House	289.49
Rent	159.00
Traveling expenses	76.04
Janitor service	95.00
Total	$3,503.35

DIPHTHERIA EXAMINATIONS.

Case number.	Place.	Collected.		Patients				Physician's Diagnosis.	Membrane present.	Day of disease.	Result.	Remarks.
		Month.	Day.	Age.	Sex	Color.	Temperature.					
79	Andover	2	4	60	M.	White	101¾	Catarrhal laryngitis and pharyngitis.	Yes	10	....	Unsatisfactory.
80	Ashville	3	25	2	M.	White	101	Diphtheria	Yes	1	+	
141	"	12	21	9	M.	White	99½	"	Yes	5	+	
109	Cambridge	10	9	18	M.	White	102	*a*	Yes	3	+	
113	"	10	22*	36	M.	*a*	*a*	Diphtheria ?)	*a*	10	—	
82	Dublin	8	30	16	F.	White	101	Diphtheria	*a*	4	+	
77	Hillsboro	1	5	7†	M.	White	98 2-5	*a*	no	1	—	Examination not wholly satisfactory.
132	Logan	11	27*	*a*	*a*	*a*	*a*	*a*	*a*	*a*	+	
142	Montpelier	11	29	17	M.	White	99½	Not positive	Yes	2	+	
86	New Lexington	8	10	10	M.	White	101	Diphtheria	Yes	4	+	
87	" "	8	10	6	M.	White	98	"	Yes	2	+	
97	" "	9	18	*a*	*a*	*a*	*a*	"	*a*	*a*	+	
81	New Paris	4	4	3	M.	White	*a*	Reserved.	Yes	9	—	Physician at first thought case was one of streptococcus infection
78	Piqua	2	2	5	M,	White	*a*	"Spasmotic laryngitis"	Yes	3	....	Unsatisfactory. Suspicious. Staining interfered with by embalming fluid.
135	Port Washington	12	28	10	F.	White	100	Diphtheria	Yes;	4	+	
136	" "	11	28	19	F.	White	normal	Catarrhal sore throat	Yes	19	+	Membrane had disappeared. Paralysis of chords.
121	Uhrichsville	11	1	6	F.	White	*a*	Diphtheria	Yes	3	+	
119	West Clarksfield	11	2	10	F.	White	*a*	"	no	11	—	Little material on swab.
122	Woodstock	10	26?	*a*	F.	*a*	*a*	"	Yes	*a*	—	Sample was secretion from patient nearly well. Sample 11 days old when received.
83	Zanesville	8	31*	13	M.	White	"high"	" ?	Yes	3	+	
84	"	8	31	11	M.	White	*a*	"	no	2	+	
85	"	8	31*	3	M.	White	101	"	Yes	2	+	
88	"	9	12	6	M.	White	100½	"	Yes	3	+	
89	"	9	12	7	F.	White	102	Follicular tonsilitis.	Yes	1	+	
90	"	9	12	8	F.	White	101	Diphtheria	Yes	2	+	
91	"	9	12	8	F.	White	100	"	Yes	3	+	
92	"	9	12	11	M.	White	102	"	Yes	1	+	
93	"	9	12	4	M.	White	100	"	Yes	2	+	
94	"	9	12	12	F.	White	100	"	Yes	2	+	
95	"	9	12	9	M.	*a*	*a*	"	Yes	4	+	
96	"	9	11	8	M.	White	99 1-5	"	Yes	2	+	
98	"	9	18	*a*	*a*	*a*	*a*	Diphtheria ?	*a*	*a*	+	
99	"	9	19	*a*	*a*	*a*	*a*	*a*	*a*	*a*	+	
100	"	9	19*	*a*	*a*	*a*	*a*	*a*	*a*	*a*	+	
101	"	9	20*	*a*	*a*	*a*	*a*	*a*	*a*	*a*	+	
102	"	9	19	11	F.	White	100½	Diphtheria	Yes	2	+	

DIPHTHERIA EXAMINATIONS—Concluded.

Case number.	Place.	Collected.		Patients				Physician's Diagnosis.	Membrane present.	Day of disease.	Result.	Remarks.
		Month.	Day.	Age.	Sex.	Color.	Temperature.					
103	Zanesville	9	21	9	F.	White	101	*a*	no	3	—	
104	"	9	24	3	M.	White	102	Diphtheria	Yes	2	+	
105	"	9	24	3	F.	White	100	"	Yes	2	+	
106	"	9	30	23	F.	White	*a*	*a*	Yes	*a*	+	
107	"	10	2	11	F.	White	100	Diphtheria	Yes	2	+	
108	"	10	4	15	F.	White	99½	"Possible diphtheria"	Yes	3	+	
110	"	10	14	5	M.	White	101	Diphtheria then follic. tonsilitis	Yes	3	+	
111	"	10	16	10	M.	White	100	"Provisionally diphtheria"	Yes	2	—	
112	"	10	17	30	F.	White	normal	'Tonsilitis, possibly diph."	Yes	4	+	
114	"	10	21	14	M.	White	102 to 99½	Diphtheria	(?)	2	—	Slight exudate about 3 or 4 follicles.
115	"	10	25	16	M.	White	*a*	"	Yes	2	+	
116	"	10	28	7	F.	White	*a*	(?)	Yes	2	+	
117	"	10	30*	7	F.	White	99½	Diphtheritic sore throat	Yes	7	—	
118	"	11	1	8	M.	White	101	"Follicular tonsilitis modified"	Yes	2	—	
120	"	11	4	14	M.	White	normal	Follicular tonsilitis.	Yes	3	+	
123	"	11	10	28	M.	White	*a*	Diphtheria.	Yes	2	+	
124	"	11	10	15	M.	White	*a*	Doubtful	Yes	3	—	
12	"	11	12	20	M.	White	*a*	Diphtheria	Yes	5	+	
126	"	11	13	2[illegible]	F.	White	102	Tonsilitis.	Yes	2	—	
127	"	11	13	6	M.	White	100 4-5	Diphtheria	Yes	2	—	
128	"	11	15	13	M	White	100½	"	Yes	2	+	
129	"	11	17	11	F	White	101	Doubtful	Yes	3	+	
130	"	11	19	14	F.	White	99½	"Probably tonsilitis"	no	3	+	
131	"	11	26	69	F.	White	normal	*a*	Yes	6	+	
133	"	11	26*	*a*	*a*	*a*	*a*	*a*	*a*	*a*	—	
134	"	11	27	40	F.	White	101	Follicular tonsilitis	Yes	2	—	
137	"	12	2	16	F.	White	100 3-5	Tonsilitis	Yes	4	+	
138	"	12	11 13	8	M.	White	100 1-5	Diphtheria	Yes	2	—	Second sample also negative.
139	"	12	14	8	M.	White	101	"	Yes	1	+	
140	"	12	14	8	M.	White	101	"	Yes	1	+	
143	"	12	31	13	M.	White	*a*	Follicular tonsilitis.	(?)	2	—	

a Unreported. * Date received. † Months. 68 examinations; 48 positive; 18 negative; 2 unsatisfactory.

MISCELLANEOUS EXAMINATIONS.

Case number.	Place.	No. of samples.	Nature of sample.	Examined for	Remarks.
8 T. b.	Bloomingburg	1	Tubercles	Tubercle bacilli	T. b. present.
63	Columbus, State House.	10	Ventilation test		See special report.
65–67	Columbus Grove	3	Fecal discharge	Supposed parasites	Partially digested cells of banana.
13 T. b.	Galena.	1	Sputum	Tubercle bacilli	T. b. not found.
8–20 Ty.	Hiram	13	Blood.	Widal reaction	See special report.
9 T. b.	London	2	Sputum	Tubercle bacilli	T. b. not found.
60	Lorain	1	Lime	Quality	Poor.
14 T. b.	Malvern	1	Sputum	Tubercle bacilli	T. b. not found.
61	Piqua	1	Worm	Identification	Nematode.
62	Rising Sun	4	Lard and meats	Trichina and ptomaines	Trichina not found — Ptomaines present.
70	Springfield Township, Clark Co.	1	Milk	Quality and typhoid.	Usable.
69	Tiffin	1	Sausage	Boracic acid	Not present.
10 T. b.	Tiro	1	Sputum	Tubercle bacilli	T. b. not found.
11 T. b.	Tiro	1	Sputum	Tubercle bacilli	T. b. present.
68	Uhrichsville	1	Preservaline	Formaldehyde	Formaldehyde present.
64	Wellington	1	Ice	Quality	Inferior.

EXAMINATIONS OF WATERS.

a. PROPOSED PUBLIC WATER SUPPLIES.

During the year 1901, examinations have been made of twenty-four samples of water from sources proposed as public suplies or as additions to existing supplies in fourteen cities or villages, as follows:

Place.	Number of samples.	Source of Samples.
* Bellefontaine	2	Well, dug.
Bradner	1	Well, drilled.
Columbus, State Hospital	1	Well, drilled.
Columbus Grove	5	Wells, drilled 3, public 1; quarry 1.
* Coshocton	2	Well, dug.
* Cuyahoga Falls	1	Cuyahoga River.
Ironton	3	Well, drilled.
Mantua	1	Well, drilled.
Oakwood	1	Well, drilled.
Plymouth	1	Run from Neiman's Springs.
Salineville	1	Well, dug.
*Steubenville	2	Well, dug.
Westerville	1	Well, drilled.
Woodsfield	2	Sunfish Creek; Kerr's Run.

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* Additional supplies.

The analytical results for the foregoing samples will be found in the section devoted to reports on proposed public water supplies. The supplies acted upon since October 31, 1901, will appear in the annual report for 1902 as that portion of the report, in compliance with law, is for the year ending October 31st.

b. EXISTING PUBLIC WATER SUPPLIES.

During the year samples of water have been examined from the following cities and villages in connection with the present public water supplies of those places:

WATER SUPPLY OF ALLIANCE.

The source of supply is Mahoning River, and the water is used without treatment other than brief subsidence in a reservoir. See report for 1898, p. 522.

Owing to the prevalence of typhoid fever in the city, request was made by the mayor for an examination of the city water. A sample was taken from a hydrant and on analysis was found polluted and unsafe.

EXAMINATION OF WATER FROM ALLIANCE.

PART PER MILLION.

Number of sample.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
1596	Feb. 21	.16	slight	very slight	vegetative	.126	.130	.011	.20

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Residue on evaporation.		Bacteria.	
				Total.	Loss on ignition.	No. per c. c.	Intestinal bacteria present.
1596	2.14	5.8	152.	394.	68.	3600.	Yes

WATER SUPPLY OF ASHTABULA.

See special report on Lake Erie supplies, elsewhere in this volume.

WATER SUPPLY OF BELLAIRE.

See special report on Ohio River supplies, elsewhere in this volume.

WATER SUPPLY OF BRIDGEPORT.

See Martin's Ferry.

WATER SUPPLY OF BUCYRUS.

The source of the present supply is an impounding reservoir on a small tributary of Sandusky River. See annual report for 1900, page 60.

An examination of the water as to quality having been requested samples were analyzed with the following results:

EXAMINATIONS OF WATERS FROM BUCYRUS.

PART PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia	Nitrites.	Nitrates.
1582	Feb. 5	.38	.12	slight	vegetative	.820	.056	.002	trace
1583	Feb. 5	.33	.05	very slight	slight vegetative	.804	.124	.003	trace
1584	Feb. 5	.....	....	....	....	....	....	.002	trace

Sample eumber.	Oxygen required.	Chlorine.	Alkalinity.	Incrusting constituents.	Residue on evaporation.		Bacteria.	
					Total.	Loss on ignition.	No. per c. c.	Intestinal bacteria present.
1582	6.48	trace	81.	45.	224.	69.	10,000	yes
1583	4.46	trace	161.	58.	317.	109.	450	yes
1584	....	trace	....	....	....	....	2,100	yes

The first sample was taken from the reservoir, the remaining two from different faucets in one of the hotels of the city. Protection of the water was strongly urged.

WATER SUPPLY OF COLUMBUS.

For a full description of the supply see annual report of the State Board of Health for 1898, page 578.

Water is derived from driven wells, filter basins, filter galleries, and the Scioto River.

Examinations were made at various times as follows:

BACTERIOLOGICAL EXAMINATION OF COLUMBUS WATER FROM FAUCET IN LABORATORY OF STATE BOARD OF HEALTH. 1901.

Sample number.	Date collected.	Hour.	Appearance of sample.	No. of bacteria per c. c.	Remarks.
1560	January 7	9:00 a. m.	Nearly clear	400	
1561	" 8	9:00 a. m.	Clear	190	Colon not found.
1568	" 16	1:30 p. m.	"	4,000	
1571	" 18	4:00 p. m.	"	2,200	
1572	" 21	9:00 a. m.	Nearly clear	1,100	
1573	" 22	3:30 p. m.	" "	550	
1574	" 24	10:00 a. m.	" "	230	
1578	" 31	4:30 p. m.	Clear	2 100	Colon not found.
1579	February 1	11:00 a. m.	"	450	
1580	" 4	9:45 a. m.	"	250	
1581	" 6	3:30 p. m.	"	1,400	
1585	" 9	9:00 a. m.	Faint hazy	12,000	
1586	" 11	1:00 p. m.	Clear	3,700	
1590	" 14	9:00 a. m.	Faint hazy	2,200	Flowing intermittently.
1591	" 15	12:30 p. m.	Nearly clear	475	
1594	" 18	8:45 a. m.	Clear	700	
1595	" 21	9:00 a. m.	"	700	
1597	" 22	12:30 p. m.	"	350	Chemical also.
1598	" 25	10:00 a. m.	"	650	
1606	March 14	3:00 p. m.	Nearly clear	3,400	
1607	" 15	5:00 p. m.	Hazy	5,400	
1619	" 21	5:15 p. m.	"	1,000	
1620	" 22	4:00 p. m.	"	750	
1622	April 2	10:45 a. m.	Nearly clear	375	[ious. Chemical also.
1629	" 4	11:00 a. m.	Hazy	600	Roilly few minutes prev-
1630	" 5	3:00 p. m.	Nearly clear	450	
1632	" 10	3:00 p. m.	" "	375	
1633	" 11	3:00 p. m.	Clear	275	
1634	" 12	2:00 p. m.	"	225	
1645	" 18	3:00 p. m.	"	350	
1649	" 19	2:00 p. m.	"	375	
1660	" 26	4:45 p m.	Nearly clear	1,300	
1668	May 1	5:00 p. m.	Clear	375	
1684	" 20	11:30 a. m.	Nearly clear	850	
1685	" 21	11:00 a. m.	Hazy	1,400	Colon bacilli present.
1688	" 28	12:00 noon.	"	900	Chemical also.
1691	June 1	9:00 a. m.	"	2.000	
1698	" 5	2:00 p. m.	Clear	450	Chemical also.
1701	" 8	12:00 noon.	"	450	
1702	" 10	9:00 a. m.	Hazy	375	
1711	" 24	3:00 p. m.	Cloudy	2,500	
1721	" 26	9:30 a. m.	Roilly	10,500	
1747	" 29	3:00 p. m.	"	2 600	
1737	July 2	3:00 p. m.	"	1,200	
1738	" 3	3:00 p. m.	Hazy	850	
1748	" 5	4:00 p. m.	"	15,000	
1753	" 10	3:00 p. m.	"	2,500	
1762	" 12	3:00 p. m.	"	1,250	

BACTERIOLOGICAL EXAMINATIONS OF COLUMBUS WATER — Concluded.

Sample number.	Date collected.	Hour.	Appearance of sample.	No. of bacteria per c. c.	Remarks.
1791	July 24	11:00 a. m.	Hazy	600	
1796	August 2	3:00 p. m.	Faint hazy	400	
1797	" 3.	10:00 a. m.	" "	375	
1812	" 9	10:00 a. m.	" "	550	
1813	" 20	5:00 p. m.	" "	800	
1849	" 21	2:30 p. m.	Nearly clear	400	
1853	" 26	10:00 a. m.	" "	500	
1856	" 30	9:30 a m.	" "	700	
1860	September 2	10:00 a. m.	" "	800	
1863	" 4	3:00 p. m.	" "	2.250	
1872	" 10	4:00 p. m.	" "	550	
1889	" 19	4:00 p. m.	" "	425	
1895	" 25	2:30 p. m.	Faint cloudy	550	
1896	" 27	9:00 a. m.	" "	160	
1942	October 28	3:00 p. m.	Nearly clear	160	
1943	" 29	11:00 a. m.	" "	300	
1946	" 30	3:00 p. m.	" "	325	
1917	" 31	11:00 a. m.	" "	275	
1976	November 7	12:15 p. m.	Clear	200	
1977	" 9	9:00 a. m.	"	110	
1979	" 11	9:00 a. m.	"	375	
1987	" 15	2.00 p. m.	"	230	
1990	" 16	10:00 a. m.	"	300	
1989	" 19	10:00 a. m.	"	450	Chemical also.
1993	" 22	4:00 p. m.	"	230	
1994	" 25	9:00 a. m.	"	500	
2001	" 29	3:00 p. m.	"	200	
2002	December 2	10:00 a. m.	"	375	
2004	" 4	4:00 p. m.	"	240	
2006	" 5	1:30 p. m.	"	550	
2009	" 13	9:00 a. m.	"	1,500	
2028	" 16	2:00 p. m.	"	4.200	
2029	" 17	11;00 a. m	Hazy	10,000	
2031	" 18	9:00 a. m.	"	16,000	
2056	" 31	3:00 p. m.	Faint hazy	550	

From the preceding results the following table of bacterial findings for the Columbus water is obtained. The average number of bacteria per cc. is the mathematical average of the findings obtained during that month.

TABLE OF BACTERIAL FINDINGS IN COLUMBUS WATER.

Month.	No. of days water was examined.	Maximum per c. c.	Minimum per c. c.	Average per c. c.
January	8	4,000	190	1346
February	11	12,000	250	2080
March	4	5,400	750	2637
April	9	1,300	225	481
May	4	1,400	375	881
June	7	10,500	375	2696
July	6	15,000	600	3567
August	7	800	375	532

TABLE OF BACTERIAL FINDINGS IN COLUMBUS WATER — Concluded.

Month.	No. of days water was examined.	Maximum per c. c.	Minimum per c. c.	Average per c. c.
September	6	2,250	160	789
October	4	325	160	265
November	9	500	110	288
December	8	16,000	240	4177

EXAMINATION OF WATERS FROM COLUMBUS.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates
1597	Feb. 22	.19	S.	S.	earthy	.142	.015	.009	2.80
1629	Apr. 4	.18	S.	S.	none	.136	.042	.006	5.90
1688	May 28	.40	.14	S.	earthy	.300	.036	.012	4 70
1698	June 5	.28	S.	S.	"	.156	.019	.001	3.04
1989	Nov. 11	.23	T.	V. S.	faint earthy	.176	.032	trace	trace

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrusting constituents.	Residue on evaporation.	
					Total.	Loss on ignition.
1597	2.97	6.0	211	186	611	153
1629	3.24	9.8	203	160	637	155
1688	6.54	5.4	188	85	535	133
1698	4.00	6.7	212	120	655	226
1989	2.92	11.6	222	151	603	....

WATER SUPPLY OF CONNEAUT.

See special report on Lake Erie supplies elsewhere in this volume.

WATER SUPPLY OF EAST LIVERPOOL.

See special report on Ohio River supplies elsewhere in this volume.

WATER SUPPLY OF GALLIPOLIS.

For the city supply see special report on Ohio River supplies elsewhere in this volume.

The Ohio Hospital for Epileptics has a separate supply derived from drilled wells. There was some cause for thinking the water had become polluted and accordingly an examination of the water was requested, with the result that the findings did not indicate fresh pollution.

EXAMINATION OF WATER FROM OHIO HOSPITAL FOR EPILEPTICS.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
1852	Aug. 22	.07	T.	T.	none	.070	.020	T	6.56

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrusting constituents.	Residue on evaporation.		Bacteria.	
					Total.	Loss on ignition.	No. per c. c.	Intestinal bacteria present.
1852	.71	42.3	134	80	426	....	50	no

WATER SUPPLY OF HILLSBORO.

The source of supply is a series of driven wells. See Annual Report of the State Board of Health for 1898, page 566. The local board of health requested that an examination be made of the city water and also of the water from a public well located in the village. The city water was found potable, but it was advised that the public well be closed. Sample Number 1819 was from the public well and Number 1820 from the city supply.

EXAMINATION OF WATER FROM HILLSBORO.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as Albuminoid ammonia.	Nitrogen as Free ammonia.	Nitrogen as Nitrites.	Nitrogen as Nitrates.
1819	Aug. 12	.06	none	none	Faint oily	.022	.006	.004	1.95
1820	Aug. 12	.12	trace	trace	trace	.018	.004	none	trace

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Residue on evaporation. Total.
1819	.71	47.2	257	512
1820	.40	2.8	278	418

WATER SUPPLY OF HIRAM.

See special report under Hiram elsewhere in this volume.

WATER SUPPLY OF IRONTON.

See special report on Ohio River supplies elsewhere in this volume.

WATER SUPPLY OF LANCASTER.

The source of supply is a gallery yielding a subsurface water influenced to a considerable degree by drainage from the city. See annual report of State Board of Health 1898, page 568.

Examination of the city water was made in June on request of the local board of health. The water was found undesirable and from the location of the source open to danger owing to the increasing pollution coming with the growth of the city. Sample number 1692 was taken from the well at the pumping station fed by the gallery; number 1693 was taken from a hydrant in the city.

Additional complaints having been made by citizens a special investigation was made by the Engineer and the Chemist of the State Board of Health. See elsewhere in this volume for report of this investigation.

EXAMINATION OF WATERS FROM LANCASTER.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
1692	June 3	T.	none	none	faint earthy	.033	.035	trace	3.30
1693	June 3	T.	none	none	faint earthy	.028	.018	trace	3.30

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrusting constituents.	Residue on evaporation.		Bacteria.	
					Total.	Loss on ignition.	No. per c. c.	Intestinal bacteria present.
1692	1.27	31.8	267	66	530	225.	170	no
1693	1.15	31.2	266	43	524	190.	130	no

WATER SUPPLY OF MARIETTA.

See report on Ohio River supplies elsewhere in this volume.

WATER SUPPLY OF MARTIN'S FERRY.

See report on Ohio River supplies elsewhere in this volume.

WATER SUPPLY OF MINGO JUNCTION.

See report on Ohio River supplies elsewhere in this volume.

WATER SUPPLY OF NEW RICHMOND.

See report on Ohio River supplies elsewhere in this volume.

WATER SUPPLY OF OXFORD.

The source of supply is a dug well. Some fears were entertained that the water was of inferior quality in dry spells, and a request was received from the local board of health for examination of the city water. The water was found to be good.

EXAMINATION OF WATER FROM OXFORD.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
1792	July 23	.08	none	none	none	.036	.026	none	T.

Sample number.	Oxygen required.	Chlorine.	Residue on evaporation.		Bacteria.	
			Total.	Loss on ignition.	No. per c. c.	Intestinal bacteria present.
1792	.56	3.4	314	82	46	no

WATER SUPPLY OF PAINESVILLE.

See report on Lake Erie supplies elsewhere in this volume.

WATER SUPPLY OF POMEROY.

See report on Ohio River supplies elsewhere in this volume.

WATER SUPPLY OF PORT CLINTON.

See report on Lake Erie supplies elsewhere in this volume.

WATER SUPPLY OF PORTSMOUTH.

See report on Ohio River supplies elsewhere in this volume.

WATER SUPPLY OF RIPLEY.

See report on Ohio River supplies elsewhere in this volume.

WATER SUPPLY OF STEUBENVILLE.

See report on Ohio River supplies elsewhere in this volume.

WATER SUPPLY OF TIFFIN.

The source of supply is a series of drilled wells supplemented at times by surface water from Sandusky River. For a fuller description of the supply see annual report of State Board of Health for 1898, page 441.

Because of the objectionable character of Sandusky River, complaints are made on the addition of surface water to the water derived from the deep wells. In July request was made by the local board of health for examination of the city water as regarded quality, and then in October a second request was made because of the prevalence of typhoid fever in the city. The examinations, like previous ones, indicate a potable water from the deep wells but pollution occurs when river water is allowed to enter. Sample number 1760 was marked "Waterworks water," being a mixture at the time of river and ground water. Sample number 1930 was taken direct from Sandusky River; number 1931 from a hydrant.

EXAMINATION OF WATERS FROM TIFFIN.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
1760	July 10	.30	.50	S.	earthy and veg.	.290	.023	none	.17
1930	Oct. 16	.22	.14	dec.	faint	.298	.025	none	trace
1931	Oct. 16	.25	S	S.	trace	.150	.016	none	trace

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrusting constituents.	Residue on evaporation.		Bacteria.	
					Total.	Loss on ignition.	No. per c. c.	Intestinal bacteria present.
1760	6.91	15.8	170	70	400	121	1,100	yes
1930	5.01	136.5	196	....	797	... ...	700	yes
1931	2.93	126.4	220	....	758	....	150	no

WATER SUPPLY OF TORONTO.

See report on Ohio River supplies elsewhere in this volume.

WATER SUPPLY OF URBANA.

The water for this supply is derived from a large dug well. For fuller details see annual report for 1899, page 132. Complaints had been made to the city council concerning the water supply, and accordingly examinations were made at the request of the council. The second sample (1768) represents the water from the reservoir, which is made use of only in cases of emergency. The first and third samples were drawn from hydrants in different parts of the city, and were reported usable under the present degree of purification.

EXAMINATION OF WATERS FROM URBANA.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
1767	July 15	.08	none	none	none	.021	.008	none	5.63
1768	July 15	.10	S.	V. S.	vegetative	.145	.021	.032	5.30
1769	July 15	.04	none	none	none	.022	.002	none	5.74

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrusting constituents.	Residue on evaporation.		Bacteria.	
					Total.	Loss on ignition.	No. per c. c.	Intestinal bacteria present.
1767	.40	5.6	279.	22.	376	66	28	no
1768	1.47	5.1	240.	15.	376	86.	55	no
1769	.44	5.7	282.	27.	392	75.	28	no

The reservoir had been recently filled from the large deep well furnishing the city supply.

WATER SUPPLY OF WELLSVLLE.

See report on Ohio River supplies elsewhere in this volume.

EXAMINATIONS OF MISCELLANEOUS WATERS

PARTS PER

Sample number.	Place.	Source of sample.	Cause for examination.	Date collected.		Color.	Turbidity.	Sediment.	Odor.	Oxygen required.
				Month.	Day.					
1635	Ada	Dug well	Typhoid	4	15					
1886	“	Drilled well	“	9	16	T	none	none	Stale	.97
1880	Akron	Dug well	“	9	13					
1881	“	“ “	“	9	13					
1882	“	“ “	“	9	13					
1883	“	“ “	“	9	13					
1884	“	“ “	“	9	13	.13	V. S.	S	Faint	1.65
1885	“	“ “	“	9	13	.13	V. S.	V. S.	“	1.90
1959	“	“ “	Quality	10	31					
1960	“	“ “	Typhoid	10	31					
1961	“	Dug and drilled well	Quality	10	31					
1962	“	Dug well	Typhoid	10	31	.07	trace	V. S.	None.	1.08
1963	“	“ “	“	10	31	.10	trace	V. S.	None.	.73
1964	“	“ “	“	10	31	.29	.16	S	Decaying wood.	13.36
1965	“	“ “	Quality	10	31	none	none	none	None.	1.23
1966	“	“ “	Typhoid	10	31	.10	none	trace	“	2.56
1967	“	“ “	Quality	10	31	.09	none	trace	“	1.08
1968	“	“ “	Typhoid	10	31					
1969	“	Spring	Quality	10	31					
1970	“	Dug well	“	10	31					
1998	“	“ “	Typhoid	11	26	trace	none	none	None.	.82
1999	“	Spring	Quality	11	26	none	none	none	“	.63
2000	“	Dug well	“	11	26	none	none	none	“	.69
1927	Andover	Drilled well	Typhoid	10	15					
1928	“	“ “	“	10	15					
1929	“	Pond	“	10	15					
1945	Ashtabula	Dug well	“	10	29					
1862	Bloomingburg	“ “	“	9	3					
1864	Buffalo	“ “	“	9	3					
1972	Byer	“ “	“	11	5	.18	trace	trace	Disagreeable	2.80
1703	Cambridge	Drilled well	Quality	6	17	none	none	none	None.	.40
1900	Camp Chase	Dug well	Typhoid	10	5					
1901	“ “	“ “	“	10	5					
1825	Cardington	“ “	“	8	13					
1826	“	“ “	“	8	13					
1827	“	Spring	“	8	13	.06	none	none	Peculiar	2.51
1828	“	Dug well	“	8	13					
1829	“	“ “	“	8	13					
1830	“	“ “	“	8	13					
1831	“	“ “	“	8	13	.09	S	S	None	4 70
1817	Cedarville	Drilled well	“	8	10					
1818	“	Dug well	“	8	10					
...	Clyde	See special rep't								
1982	Delaware tp, Hancock co.	Drilled well	“	11	11	.10	dec.	dec.	None.	.97
1836	Ellsworth tp., Mahoning co.	“ “	“	8	13					
1576	Findlay	“ “	“	1	31					
1577	“	Dug well	“	1	31					
1575	Florence tp., Williams co.	“ “	“	1	14					
1587	Forest	Drilled well	Quality	2	11					
1588	“	“ “	“	2	11					
1592	“	“ “	“	2	15	.05	T	T	None.	.55
1593	“	“ “	“	2	15	.05	T	T	“	.51
1971	Fremont	“ “	Typhoid	11	4	.10	none	T	“	1.17
2032	Gibsonburg	Quarry	Source of ice supply	12	17	none	none	none	Stale	2.10
2033	“	“	“ “	12	17	.18	T	T	“	5.76
1670	Girard	Dug well	Typhoid	5	6					
1871	“	“ “	“	9	5					
1567	Greenville	“ “ school	“	1	15	.10	none	T	None.	1.22
1894	Grove City	“ “ “	“	9	24	T	none	T	“	.66
1566	Hillsboro	Drilled well	“	1	8					
....	Hiram	See special rep't	“							
1992	Hopewell tp, Perry co	Driven well	“	11	21	.05	S	S	Earthy	.63
1948	Independence	Dug well	“	10	30					
1949	“	“ “	“	10	30					
1950	“	“ “	“	10	30					

FROM PRIVATE SUPPLIES AND SPECIAL SOURCES.

MILLION.

Nitrogen as				Chlorine.	Alkalinity.	Incrusting constituents.	Total solids.	Loss on ignition.	Character of bacteria.	Bacteria per c. c.	Remarks.
Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.								
....	....	.003	1.07	25.3	.....	.....	....	....	W	600	Suspicious.
.042	.029	.006	1.02	25.5	426	.....	625	....	Colon	85	Condemned.
....	...	.022	12.17	37.8	......	.....	...	....	Suspicious	27,000	Advised condemning.
....	....	.003	5.41	21.3	......	......	....	....	W	3,800	Undesirable.
....	....	.004	7.77	34.8	......	.....	....	...	Colon	6,700	Advised condemning.
...	....	.006	none	5.0	.....	......	....	....	W	750	Usable.
.146	.134	.072	12.45	47.2	....	.....	563	...	....	....	Advised condemning.
.080	.011	.005	13.80	31.5	......	......	295	....	....	......	Undesirable.
...	....	.005	10.84	37.5	......	......	....	...	W	1,600	Undesirable.
....	....	none	none	1.0	.....	.....	....	....	W	400	Good.
....	....	.018	16.34	62.6	......	......	....	...	W	1,200	Unsafe.
.020	.002	none	15.34	48.4	107	....	769	...	....	....	Not desirable.
.106	.062	.008	10.50	90.4	47	.....	651	....	....	....	Advised condemning.
.172	526	.003	4.66	11.1	62	.....	.. ..	....	....	....	Advised condemning.
.018	.003	none	6.67	48.0	170	.....	....	..	....	....	Usable. Not desirable.
.152	.032	.072	7.66	56.9	217	.....	....	...	....	....	Unsafe.
.114	.017	.001	1.20	19.1	277	......	...	...	....	... .	Advised protection.
....	. .	none	4.50	6.1	......	....	...	....	W	25	Asked for chemical sample.
....	...	none	9.84	15.9	.....	.....	....	....	W	6	Asked for chemical sample.
....	....	.008	3.00	58.3	....	......	....	...	W	700	Asked for chemical sample.
.069	.016	trace	6.88	8.4	31	......	444	...	W	28	Not desirable.
.060	005	none	12.32	58.5	120	.. .	632	...	W	300	Not desirable.
.059	.022	.008	1.56	63.1	152	.....	701	..	W	350	Not desirable.
....	....	none	.10	......	....	..	....	....	W	24	Usable.
....	....	none	trace	....	.....	.....	...	...	W	50	Usable.
....	...	.002	none		.....	.....	...	...	Colon	2,800	Polluted.
....	....	.024	1.60	69.0	....	..	...	...	Colon	3,100	Polluted. Condemned.
....	....	.002	16.67	72.9	....	....	...	....	Colon	1,700	Polluted. Condemned.
....	...	none	17.71	68.0	...	......	...	...	Colon	2,200	Polluted. Condemned.
147	.021	.005	none	10.2	96	. ...	..	...	W	450	Usable.
.042	.007	.006	13.20	90.3	184	179	959	350	....	....	Condemned.
....	....	.160	51.80	157.6	...	....	....	....	Colon	4,500	Polluted. Ordered closed.
....	....	.003	17.60	84.5	.....	......	...	....	W	2,300	Polluted. Ordered closed.
....	....	050	8.80	44.1	....	.....	..	....	W	200	Advised condemning.
...	....	.010	28.55	204.0	.....	..	....	...	W	2,800	Advised condemning.
.154	.092	none	trace	20.3	368	.....	705	....	W	1,000	Advised protection.
....	....	.002	10.50	49.1	.....	......	...	....	W	1,900	Advised abandoning.
....	....	006	6.30	21.4	.....	....	..	....	W	2,400	Advised abandoning.
....	...	none	trace	13.4	....	.....	....	....	W	160	Usable.
.112	.020	.005	none	28.3	371	......	768	..	.. ..	275	Advised protection.
....	....	none	trace	6.8	.....	......	..	....	W	107,000	Usable.
....	....	.900	26.00	65.0	.....	.....	....	...	W	278,000	Condemned.
.298	.430	.004	none	3.9	422	...	....	....	W	19	Usable.
. ..	....	.003	.15	1.2	.....	....	...	....	W	8	Usable. Advised protection.
....	....	none	T	89.6	......	......	...	...	W	475	Usable.
....	...	none	6.10	61.2	.	. .	...	...	W	220	Advised abandoning.
....	. ..	none	none	1.7	.....	.....	....	....	W	650	Usable.
....	....	none	none	5.9	..	.... ..	....	...	W	700	Usable.
....	...	none	none	3.7	.....	....	....	....	W	1,700	Usable.
.057	.458	none	none	6.0	375	175	1303	318	....	... ...	Usable.
.063	.396	none	none	3.8	331	106	741	202	....	550	Usable.
.078	.046	.003	none	1.8	307	..	....	...	W	18	Usable.
.168	.024	.028	4.64	33.1	.....	.....	....	....	W	300	Usable.
.576	.178	.002	.12	29.0	...	......	....	...	W	350	Usable. (?
...	....	.006	3.96	8.1	.....	....	...	..	W	1,100	Advised abandoning.
....	...	.026	15.40	87.7	.....	.....	....	...	Colon	500	Polluted. Condemned.
.060	.006	none	1.28	17.4	.....	.....	445	116	W	1,400	Usable.
.052	.023	T	5.66	43.6	298	....	696	..	W	850	Usable.
....	....	none	7.95	57.9	.....	.....	....	...	W	180	Suspicious.
....	...	....	......	.. ..	......	. ..	..	....	....	......	
.036	.016	none	T	1.9	267	.....	294	....	W	9	Usable.
....	....	T	23.25	81.6	......	.....	..	...	W	180	Suspicious.
....	....	.001	7.58	17.5	....	.....	...	....	W	550	Suspicious.
....	....	.002	2.36	1.0	......	......	...	....	W	200	Suspicious.

EXAMINATIONS OF MISCELLANEOUS WATERS FROM

PARTS PER

Sample number.	Place.	Source of sample.	Cause for examination.	Date collected.		Color.	Turbidity.	Sediment.	Odor.	Oxygen required.
				Month.	Day.					
1926	Kenton	Dug well.	Typhoid	10	15	.10	none	none	None.	2.55
....	Lancaster	See special rep't								
2030	Latchie	Drilled well	"	12	16	.08	dec.	dec.	None.	3.04
1813	Lower Paint tp., Fayette co.	Dug well.	"	8	10	T	none	none	"	.64
1564	Mad River tp., Montgomery co	Spring	"	1	7	....	....	....	....	....
1565	" " "	Driven well	"	1	7	....	....	....	....	....
1636	Malvern	Spring	Quality	4	16	....	....	....	....	....
1637	"	Dug well	Typhoid	4	16	....	....	....	....	....
1659	Mingo Junction	" "	"	4	25	.05	T	S	None.	.93
1631	Monroe	" "	"	4	8	....	....	....	....	....
1665	Moorefield	" "	" last year	4	30	T	none	S	Faint	3.17
1666	"	" "	" "	4	30	T	none	T	"	.78
1667	"	" "	" "	4	30	T	none	T	None.	.88
1700	New Carlisle	Well	Pollution	6	8*	....	....	....	....	....
1736	" "	Dug and drilled well	Intestinal disturbance	7	1	.12	T	V. S.	None	.29
1669	New Vienna	Drilled well, school	" "	5	2	.10	.08	S	"	3.41
1951	North Dover	Dug well	Typhoid	10	30	.10	S	S	"	2.81
1952	" "	" "	"	10	30	.55	S	S	"	16.72
1953	" "	" "	"	10	30	.15	S	S	"	3.70
1954	" "	" "	"	10	30	.11	T	V. S.	"	1.13
1955	" "	" "	Quality	10	30	.12	V. S	S	"	1.62
1956	" "	" "	Typhoid	10	30	.50	S	S	Strong	7.18
1997	Orange tp., Delaware co.	" "	"	11	26	.05	.22	dec.	Earthy.	1.97
1765	Painesville	" " college	Quality	7	10	.05	none	none	None.	.67
1869	"	" " "	"	9	4	T	none	none	"	.90
1933	Randolph.	" "	Typhoid	10	21	.12	trace	V. S.	Faint.	.73
2020	Shelby	Cistern	"	12	11	high	.16	V. S.	"	3.91
2021	"	Dug well	"	12	11	.12	T	V. S.	None	2.20
2022	"	" "	"	12	11	.10	T	T	"	1.74
2023	"	" "	"	12	12	.15	T	T	Faint.	2.87
2024	"	" "	"	12	12	.12	T	T	None.	2.43
2025	"	" " school	"	12	12	.05	T	T	"	1.51
1694	Sidney	" "	"	6	3	....	....	....	....	....
1695	"	" "	"	6	3	....	....	....	....	....
1865	South Charleston	" " school	Quality	9	2	.15	.05	S	Faint.	2.24
1866	" "	" "	"	9	2	.15	T	S	Woody	2.65
1941	Springfield tp., Clarke co.	" "	Typhoid	10	28	....	....	....	....	....
1854	Steubenville	" "	Intestinal disturbance	8	27	.15	S	S	Faint of oysters	2.59
1940	"	Spring	Quality	10	28	05	none	none	None	.23
1569	Suffield	Dug well	Typhoid	1	15	.45	.06	C	Peculiar	6.53
1570	"	" "	"	1	15	.10	T	V. S.	Faint	.86
1624	"	" "	"	4	2	.12	none	T	None.	1.08
1625	"	" " school	Quality	4	2	.14	none	T	Woody	.99
1626	"	Pond	Influence	4	2	.60	T	V. S.	Vegetative	9.01
1841	"	Dug well	Typhoid	8	19	....	....	....	....	....
1621	Summerfield.	" "	"	4	1	....	....	....	....	....
1988	Tiffin	Drilled well	"	11	15	.05	T	T	Peculiar	.80
1766	Toledo	Driven well	Quality	7	12	.08	none	none	....	2.49
1934	Tontogany	Dug well	Typhoid	10	10	....	....	....	....	3.72
1935	"	Public dug and drilled well	"	10	10	....	....	....	....	2.10
1936	"	Dug well.	"	10	10	....	....	....	....	4.00
1937	"	" "	"	10	10	....	....	....	....	2.39
1995	Uhrichsville	Ice pond, old creek bed	Ice supply	11	26	.30	.16	S	Earthy and veg.	6.21
1996	"	" "	" "	11	26	.28	.14	S	" "	3.20
1627	Wadsworth	Drilled well	Typhoid	4	3	....	....	....	....	....
1628	"	" "	"	4	3	....	....	....	....	....
1652	"	Spring	"	4	22	.20	.10	C	Earthy.	.52
1653	"	Drilled well	"	4	22	.10	.09	S	None.	1.60
1654	"	Pond	Influence	4	22	.20	1.00	M	Earthy and veg.	15.04

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* Date received.

PRIVATE SUPPLIES AND SPECIAL SOURCES — Continued.

MILLION.

Nitrogen as Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.	Chlorine.	Alkalinity.	Incrusting constituents.	Total solids.	Loss on ignition.	Character of bacteria.	Bacteria per c. c.	Remarks.
.112	.014	.001	49.00	65.7	388	......	1364	...	W	480	Ordered closed.
.036	.033	none	T	T	302	.....	689	....	W	1,600	Usable.
.023	.004	.007	7.70	20.2	353	.....	603	...	W	210	Advised abandoning.
....	.....	none	.21	1.9	.....	.....	....	...	W	475	Advised protection of well.
....	.....	none	.12	1.3	......	.....	....	....	W	46	Advised closing on account of surroundings.
...	....	none	5.87	1.7	.....	.....	....	....	W	130	Advised protection.
..	....	none	11.01	3.5	.....	.....	...	....	W	475	Advised condemning.
.064	.020	.004	10.75	12.5	.....	.....	...	....	W	95	Advised cleaning
...	.....	T	15.60	198.8	.....	.....	...	....	Colon	1,900	Ordered closed.
.112	.017	.001	26.70	245.5	.....	......	2520	....	W	1,700	Undesirable.
.037	.011	.002	13.70	66.9	.....	....	1132	...	W	900	Undesirable.
.052	.007	.001	20.40	94.5	.....	......	1241	....	W	350	Undesirable.
....	...	none	.....	.....	.....	......	..	...	W	28,000	Unsatisfactory. Too little water.
.030	.003	.003	22.10	9.0	258	50	448	...	....	....	Advised closing.
.240	1.650	T	none	T	439	none	463	..	....	....	Usable.
.220	.032	.001	9.30	94.2	103	......	627	....	W	550	Polluted.
.764	.386	T	5.66	57.4	4	......	652	....	W	1,200	Polluted.
.256	.082	.044	9.34	136.7	117	.....	698	....	Colon	500	Polluted.
.075	.014	none	none	5.2	15	.....	155	....	W	550	Usable.
.171	.780	none	none	107.3	327	......	825	....	W	100	Usable.
.331	.664	none	T	40.9	417	....	653	....	Colon	1,700	Polluted.
.140	.650	.001	T	16.1	258	256	3560	....	W	8	Undesirable.
.062	.007	.002	8.49	14.6	47	......	308	99	Suspicious	2,000	Advised closing.
.081	.021	.001	12.05	20.3	52	.....	396	...	Suspicions	1,150	Condemned.
.066	.121	.007	8.96	20.3	208	. ..	102	....	W	180	Suspicious.
.098	.150	.034	T	none	30	......	84	....	W	375	Advised cleaning and inspection.
.121	.008	.001	5.00	65.8	318	......	703	....	W	1,800	Advised abandoning.
.102	.018	none	.07	18.1	372	....	783	....	W	2,800	Suspicious.
.094	.094	T	1.36	15.4	251	.....	582	....	W	8,200	Ordered closed.
.056	.005	none	.08	11.2	300	.....	520	...	W	1,200	Suspicious.
.042	.008	none	1.32	12.5	244	.....	405	....	W	1,200	Usable.
....	.....	T	3.60	39.0	.....	.....	...	....	W	160	Usable.
....	....	.001	9.67	13.1	....	.....	...	....	W	1,300	Undesirable.
.096	.080	none	T	3.8	385	. . .	601	....	....	......	Usable.
.100	.006	.010	9.87	8.4	340	.....	545	....	....	......	Suspicious.
....	....	.002	8.80	11.0	....	.. ..	....	....	Colon	425	Polluted.
.090	.050	.600	5.65	13.2	75	....	360	...	Suspicious	23,000	Condemned.
.064	.006	none	none	2.7	135	.....	461	....	W	425	Good.
.294	1.066	.070	13.56	85.2	......	.....	570	255	....	180	Condemned.
.067	.026	none	10.40	19.3	......	.. ..	244	126	W	200	Suspicious.
.094	.016	none	23.75	67.9	78	179	721	257	W	200	Advised abandoning.
.090	.010	.012	12.42	69.1	31	95	508	96	W	375	Advised abandoning.
.518	.032	.002	1.15	1.5	7	none	48	18	....	....	Polluted.
....	....	.004	5.76	.7	.....	.....	...	...	W	450	Advised protection.
...	...	none	3.68	21.8	......	......	...	...	W	550	Undesirable.
.082	.004	.002	3.36	31.1	338	.. ..	672	....	W	5,600	Undesirable.
....	.....	none	trace	49.4	.....	.....	2138	512	W	1,700	Undesirable.
....	.....	none	.10	30.5	325	.....	...	....	Colon	42,000	Advised condemning.
....	.....	T	T	93.9	202	.. ..	...	....	Colon	16,300	Advised condemning.
....	....	.004	5.92	174.4	358	.. ..	....	....	Colon	10,400	Advised condemning.
....	.....	.008	.04	57.4	224	......	....	....	Colon	3,900	Advised condemning.
.432	.116	none	.10	4.1	152	.....	284	....	Colon	1,000	Polluted.
.196	.040	none	.08	6.2	137	......	302	....	Colon	750	Undesirable.
...	.....	T	.49	6.2	. ...	. ...	...	....	W	1,300	Asked for chemical sample.
....	.....	T	.31	6.3	......	......	.	....	W	950	Asked for chemical sample.
.012	.013	none	T	T	167	60	309	....	....	....	Usable if protected.
.074	.052	.006	T	8.2	167	41	304	....	....	....	Suspicious.
.570	.161	.006	T	26.4	43	58	587	...	....	....	Polluted.

EXAMINATION OF MISCELLANEOUS WATERS FROM

PARTS PER

Sample number.	Place.	Source of sample.	Cause for examination.	Date collected.		Color.	Turbidity.	Sediment.	Odor.	Oxygen required.
				Month.	Day.					
1877	Warren	Drilled well....	Quality	9	12	.21	S	none	None.	2.95
1623	Waterville	Dug well.......	Typhoid	3	31	......	......	......	....	......
1907	Waynesfield	" "	"	10	7	.05	T	T	None	1.51
1686	York township, Athens county.	" "	"	5	21	......	......	......	....	.... .
1687	" " " .	" "	"	5	21	......	.....	.....	... .	......
1589	Yorkville	Driven well. ..	Quality	2	13	.....	... ..	.....	....	.....
1697	Zanesville	" " ...	Typhoid	6	4	....	......	......	....	.....

PRIVATE SUPPLIES AND SPECIAL SOURCES—Concluded.

MILLION.

Nitrogen as				Chlorine.	Alkalinity.	Incrusting constituents.	Total solids.	Loss on ignition.	Character of bacteria.	Bacteria per c. c.	Remarks.
Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.								
.254	.158	.006	T	91.8	578	none	1286	...	....	....	Undesirable.
....	....	none	12.20	57.0	. ..	.....	...	....	W	300	Undesirable.
.118	.046	.002	.16	5.9	......	.....	...	....	W	250	Suspicious.
....	....	.008	27.10	86.0	......	.....	....	....	W	9,600	Advised condemning.
....	..	T	18.40	66.0	......	......	....	....	W	140	Advised abandoning.
....	....	.056	4.80	12.2	......	.... .	....	....	W	325	Suspicious.
....	....	T	T	.9	....	.....	....	....	W	1,300	Usable.

* Date received; date of collection was not reported.

W. In determining the character of the bacteria present in a sample, no attempt was made to isolate other than intestinal bacteria, and W means that intestinal bacteria were wanting in the sample under investigation.

‡ The final opinion as to any water was based on a joint consideration of the analytical data, the sanitary survey of the source of the sample, and the history of disease among the users of the well, together with any other available information in the case.

EXAMINATION OF RIVER AND LAKE SAMPLES.

The results of the examinations of samples from the Ohio River and Lake Erie together with samples from the various public supplies obtained from those sources will be found under a separate heading in a subsequent portion of this report.

SUMMARY OF LABORATORY WORK FOR 1901.

During the year analyses have been made of 609 samples, divided as follows: Diphtheria, 68; miscellaneous, 48; waters, 493. These samples involved a total of 1319 distinct examinations not including special examinations employed from time to time on various samples. It is well, in this connection, to note that but few of the samples were of a nature involving the brief examinations in laboratory work, while the large majority of the samples were waters — the bacteriological, chemical, and at times partial mineral examinations, of which are processes involving much more time and labor than the briefer examinations a public health laboratory is frequently called upon to perform. Hence the mere number of samples or examinations does not convey a proper idea of the labor required, unless the nature of these examinations is also considered.

LIST OF

CITIES AND VILLAGES

HAVING

BOARDS OF HEALTH

WITH THE NAME OF

HEALTH OFFICER.

May 1, 1902.

HEALTH OFFICERS.

CITIES.

Akron	Dr. A. A. Kohler.
Alliance	Dr. P. W. Welker.
Bellaire	Dr. D. W. Boone.
Bucyrus	Dr. A. H. McCrory.
Canton	Dr. J. F. Marchand.
Chillicothe	Dr. W. S. Scott
Cincinnati	Dr. Clark W. Davis
Circleville	Mr. Wm. H. Dunkel.
Cleveland	Dr. Martin Friedrich.
Columbus	Dr. W. D. Deuschle.
Dayton	Dr. C. W. King.
Defiance	Dr. E. E. K. Chapman.
Delaware	Dr. J. K. James.
East Liverpool	Dr. C. B. Ogden.
Fremont	Dr. O. H. Thomas.
Findlay	Mr. Amos Beardsley.
Fostoria	Mr. W. N. Caldwell.
Galion	Dr. H. H. Hartman.
Gallipolis	Dr. F. A. Cromley.
Greenville	Dr. John D. Kerlin.
Hamilton	Dr. August Schumacher.
Ironton	Dr. J. W. Lowry.
Kenton	Mr. J. H. Bonham.
Lancaster	Dr. F. P. Stukey.
Lima	Dr. E. E. McCall.
Mansfield	Dr. J. Harvey Craig.
Marietta	Dr. J. B. McClure.
Massillon	Dr. T. Clarke Miller.
Martins Ferry	Dr. J. W. Darrah.
Marion	Dr. E. H. Raffensperger.
Middletown	Dr. Geo. D. Lummis.
Mt. Vernon	Dr. R. W. Colville.
Newark	Dr. Henry Day.
Norwalk	Dr. Edgar Martin.
Piqua	Dr. F. E. Kitzmiller.
Pomeroy	Dr. R. E. Stobart.
Portsmouth	Dr. Louis A. Vernier.
Salem	Dr. A. C. Yengling.
Sandusky	Dr. Wm. H. Busch.
Steubenville	Mr. Geo. B. Winters.
Springfield	Dr. Henry H. Seys.
Tiffin	Dr. A. C. Schwartz.
Toledo	Dr. W. W. Brand.
Troy	Dr. G. E. McCullough.
Urbana	Dr. H. M. Pearce.
Warren	Dr. D. E. Hoover.
Washington C. H	Mr. J. M. Edwards.

Wellston	Mr. Thos. McGuire.
Wellsville	Mr. Jos. T. Warren.
Wooster	Dr. J. W. Lehr.
Xenia	Dr. A. D. DeHaven.
Youngstown	Dr. H. E. Welch.
Zanesville	Dr. Charles P. Sellers.

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Adamsville	Mr. S. J. Lane.
Adelphi	Mr. W. S. Koch.
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Albany	Dr. A. F. Holmes.
Alger	Dr. U. P. L. Vermillion
Alvordton	Dr T. E. Schrider.
Andover	Mr. L. W. Houghton.
Anna	Dr. C. W. Harbour.
Ansonia	Dr. H. A. Snorf.
Antwerp	Mr. Elmer Cole.
Apple Creek	Mr. W. H. Winkler.
Arcadia	Mr. F. L. Smart.
Arcanum	Mr. E. B. Hawley.
Archbold	Mr. August Ruihley.
Arlington	Mr. Solomon Bates.
Ashland	Dr. B. Myers.
Ashtabula	Dr. A. W. Hopkins.
Ashley	Dr. H. N. Coomer.
Ashville	Mr. J. W. Johnson.
Athens	Dr. J. M. Higgins.
Attica	Dr C. A. Force.
Avon	Dr. John R. Pipes.
Bainbridge	Dr. R. H. McKee.
Bakersville	Dr. J. D. Lower
Baltimore	Dr. C. M. Alt.
Barberton	Dr. F. Lahmers.
Barnhill	Mr. John Stevenson.
Barnesville	Mr. W. A. Talbot.
Batavia	Dr. Charles R. Belt.
Batesville	Mr. Caleb Mercer.
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Beallsville	Dr. John W. Reed.
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Bedford	Mr C. W. Kerslake.
Bellbrook	Mr. G. H. Lamb.
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Bellefontaine	Dr. J. S Deemy.
Belleville	Mr. Levi Sell.
Bellevue	Dr. E. D. Smith.
Belmore	Dr. C. B. Adrian.
Belmont	Mr. David S. Pierce.
Benton Ridge	Dr. R. D. Whisler

Berea	Dr. E. O. Hess.
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Berlin Heights	Dr. G. W. Hine.
Bethel	Dr. Julius D. Abbot.
Bettsville	Dr. Geo. W. Willard.
Beverly	Mr. Jos. E. Hall.
Blanchester	Dr. S. B. Judkins.
Bloomingburg	Mr. L. Dillinger
Bloom Centre	Dr O. C. Wilson.
Bloomdale	Mr. E. Wirteland.
Bloomingdale	Mr. E. R. Blackburn, Clerk.
Bloomville	Dr. T. C. Loose.
Bluffton	Dr. John J. Sutter.
Bond Hill	Mr. D. Edw. Murphy.
Botkins	Mr. Allen Wical.
Bourneville	Dr. J. A. VanWinkle.
Bowerston	Dr. C. E. Siegrist.
Bowersville	Mr. S. A. Bowermaster.
Bowling Green	Mr. A. Ordway.
Bradford	Mr. John Tinkler.
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Buchtel	Dr. H. T. Lee.
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Butler	Dr. E. G. Rummel.
Burton	Dr. W. H. Shank.
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Cadiz	Dr. S. H. Kent.
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Caledonia.	Mr. Noah Lee.
Calais	
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Canal Fulton	Mr. George Becker.
Canal Winchester	Dr. W. S. Gayman.
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Carey	Dr. W. A. Crum.
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Carrollton	Dr. A. H. Hise.
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Catawba	Dr. J D. Thomas.
Cecil	Dr. S. E. Demuth.
Cedarville	Mr. M. H. Shroads.

Celina	Dr. L. P. Lisle.
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Chardon	Mr. N. M. Goodrich.
Chatfield	Dr. Jos. H. Mollenkop.
Chester Hill	Dr. J. A. Penrose.
Chesterville	Dr. W C. Hodges.
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Clarington	Mr. John E. Morrill.
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Clarksburg	Dr. J. F. Simpkins.
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Cleveland Heights (Hamlet)	Dr. F. F. Quilliams.
Cleves	Dr. C. W. Smedley.
Clifton	Dr. J. H. Harris.
Coalton	Mr. M. K. Glenn.
Coal Grove	Dr. S. A. Lambert.
Clyde	Mr. F. G. Tuttle.
Coldwater	Dr. C. F. Bollman.
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Collinwoood	Dr. P. E. Kerlin.
Columbiana	Mr. George Roninger.
Columbus Grove	Mr. J. F. Bogart.
Commercial Point	Mr. W. J. Rout.
Congress	Mr. Clyde M. Holmes.
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Hammondsville	
Hamersville	
Hamler	Mr. P. C. Lowe.
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Kimbolton	Mr. S. A. Clarke.
Kingston	Dr. C. C. Hatfield.
Kirby	Dr. E. E. Burns.
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Lakeside	Mr. Wm. Carroll.
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Lakeview	Dr. V. F. Barrett.
LaGrange	Dr. G. N. Snyder.
Larue	Dr. G. A. L. Markwith.
Latty	Dr. C. W. Gordon.
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Laura	Dr. S. P. Neff.
Lebanon	Dr. G. M. Curry.
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Leesville	
Leetonia	Dr. H. B. Kurtz.

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Lewisville	Dr. L. P. Diehl.
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Lindsey	
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Little Sandusky (Hamlet)	
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Lockland	Mr. Val Harting.
Lockville	
Lodi	Mr. Henry Selders.
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London	Dr. M. Vance.
Lorain	Dr. Edward V. Hug.
Loramies	Dr. Thos. Walkup.
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Louisville	Dr. C. A. Walker.
Loveland	Dr. C. Haarlammert.
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Lowelville	Mr. J. H. McWilliams.
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Lucas	
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Magnolia	Mr. L. H. Scheideger.
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McClure	
McComb	Dr. J. A. Howell.
McConnelsville	Mr. Wm. Dille.
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Mechanicsburg	Dr. Jno. C. Hathaway.

Mechanicstown	
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Mentor	Dr. Lester H. Luse.
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Middleport	Dr. David Sisson.
Middle Point	
Miamisburg	Dr. C. F. Ginn.
Milan	Mr. Richard Rawl.
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Milton (Hamlet)	
Milton Center (Hamlet)	Dr. J. F. Noble.
Millburg	
Milledgeville	Dr. W. T. Mathews.
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Millersburg	Mr. C. J. Fischer.
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Mineral Ridge	Dr. J. M. Elder.
Minerva	Mr. J. C. Young.
Mingo Junction	Mr. George B. Kneff.
Minster	Dr. R. A. Rulman.
Mohican	
Monroeville	Dr. E. R. Kreider.
Montezuma	Dr. W. H. Tippie.
Montpelier	Dr. Blair Haggerty.
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Morrow	Mr. E. Wilkerson.
Moscow	Dr. W. S. Purkhiser.
Mt. Airy	
Mt. Blanchard	Dr. R. N. Lee.
Mt. Cory	Mr. Jacob Doty.
Mt. Eaton	
Mt. Healthy	Dr. J. Ferris.
Mt. Gilead	Dr. F. C. Griffis.
Mt. Pleasant	Mr. Thos. P Gorsuch.
Mt. Oreb	Mr. John Walker.
Mt. Sterling	Dr. C. T. Gallagher.
Mt. Washington	Dr. W. C. Langdon.
Mt. Victory	Dr. A. N. Titsworth.
Murray City	Dr. T. J. Dillinger.
Mutual	Mr. C. M Goul.
Napoleon	Mr. O. E. Barnes.
Nashville	
Navarre	Mr. John Bailiss.
Nelsonville	Dr. N. Hill.
Nevada	Dr. S. S. Barrett.
Neville	Dr. N. S. Hill.
New Albany	Mr. Christopher Horlocker.
New Alexandria	

New Athens	Dr. Albert Dickerson.
New Bloomington (See Agosta P. O.)	
Newburgh	Dr. E. G. Radway.
New Bremen	Dr. M. S. Ekermeyer.
New Carlisle	Dr. A. A. Luther.
Newcomerstown	Mr. D. C. Whiting, Jr.
New Concord	Dr. Henry McCreary.
New Holland	Mr. Samuel McGath.
New Knoxville	Dr. H. E. Fledderjohann.
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New Stark	
New Straitsville	Mr. Wm. Vorhees.
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Newton Falls	Mr. A. T. Thayer.
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New Washington	Dr. Burton R. Miller.
New Waterford	Mr. A. J. Hayes.
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North Baltimore	Dr. J. W Stoner.
North Lindale	Mr. H. Geariety.
North Lewisburg	Mr. A. Spain.
North Robinson	Mr. J. J. Robertson.
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Norwood	Dr. J. C. Cadwallader.
Oak Harbor	Mr. Ephraim Gordon.
Oak Hill	Mr. Wm. Jenkins.
Oakwood	Mr. W. E. Osborne.
Oakley	Mr. E. C. Wamacks.
Oberlin	Mr. E. L. Burge.
Ohio City	Mr. S. R. Mapes.
Olmstead Falls	Mr. H. B. Northrop.
Orangeville	
Orrville	Dr. A. A. Brooks.
Osborne	
Osgood	Mr. H. H. Brander.
Osnaburg	Dr. W. D. Davis.
Ostrander	Dr. A. J. Pounds.
Ottawa	Dr. E. L. Tupper.
Ottoville	Dr. A. Binder.
Otway	Mr. Simon Crow.
Owensville	Dr. G. G. Rutledge.
Oxford	Mr. W. E. Calohan.
Palestine	

Patriot (Hamlet)	
Patterson	Mr. P. C. Breidenbach.
Painesville	Mr. S. A. Haskell.
Pancoastburg P. O. (Waterloo)	
Paris	
Pataskala	Mr. Frank McConnaughey.
Paulding	Dr. John H. Hosford.
Payne	Dr. J. E. Mulligan.
Peebles	Dr. O. W. Robe.
Pemberville	Dr. R. J. Simon.
Peninsula	Dr. W. N. Boerstler.
Perrysburg	Dr. J. H. Reinfrank.
Perrysville	Mr. Geo. W. Shehan.
Phillipsburg (Center P. O.)	
Philo P. O. (Taylorsville)	Dr. G. B. Trout.
Pickerington	
Pierce (Stark Co.)	
Piketon	Mr. S. H. Cutler.
Pioneer	Mr. S. P. Waters.
Plain City	Dr. E. S. Holmes.
Plainfield	
Pleasant City	Mr. John F. Secrest.
Pleasant Hill	
Pleasant Ridge	Mr. C. W. Acomb.
Pleasantville	Mr. Charles C. Hempey.
Plymouth	Dr. C. A. Overholt.
Poland	Dr. C. R. Justice.
Polk	Dr. W. H. Rhinehart.
Portage	Mr. T. Fasnaugh.
Port Clinton	
Port Jefferson	Dr. S. S. Crumbaugh.
Port Washington	Dr. E. S. Dunn.
Port Williams (Hamlet)	Mr. S. L. Thorpe.
Powhatan Point	Mr. Franz Saner.
Proctorville	Dr. W. W. Reynolds.
Prospect	Mr. G. F. Gast.
Put-in-Bay	Mr. Adam Heidle.
Quaker City	Mr. J. W. Parker.
Quincy	Mr. G. B. Plummer.
Racine	Dr. C. N. Hayman.
Rarden	Dr. H. F. Clark.
Rawson	Mr. J. J. Hawk.
Ravenna	Mr. Lee W. Wood.
Reading	Mr. Riley Murphy.
Rendville	Dr. H. S. Cozad.
Republic	Dr. F. C. Gilcher.
Reynoldsburg	Mr. B. F. Oram.
Richmond (Grand River P. O.)	
Richmond	Dr. Samuel Rothacker.
Richville (Hamlet)	
Richwood	Mr. G. W. Morgan.
Ridgeway	Dr. E. B. Crow.
Ringgold	
Ripley	Mr. G. M. Robb.

Rising Sun	Mr. Amos Bigley.
Robertsville	
Rockford	Mr. O. Hedges.
Rochester	Dr. J. C. Dignan.
Rock Creek	Dr. W. S. Weiss.
Rockport (Hamlet, See Kamms P. O.)	
Rocky Ridge	Mr. Wm Schlegel.
Rogers	Mr. C. T. McArtor.
Roseville	Mr. G. B. Weaver.
Rossville (See Hagerman P. O.)	
Royalton	
Rushsylvania	Mr. W. H. Drum.
Rushville	Dr. W. G. Lewis.
Russellville	
Sabina	Mr. H. C. Curtis.
Salesville	Mr. W. E. McKinley.
Salineville	Dr. H. M. Calvin.
Sarahsville	Dr. W. S. Williams.
Savannah	Mr. A. C. Stahl.
Scio	Dr. W. C. Black.
Scott	Mr. F. W. Beamer.
Sebring	Mr. Walter Crewson.
Sedalia	Dr. E. B. Mead.
Senecaville	Dr. W. R. Scott.
Sekitan (See Addyston P. O.)	
Seville	Dr. P. E. Beach.
Seven Mile	Mr. Henry Jacobs.
Shawnee	Dr. E. C. Mann.
Shelby	Dr. M. W. Bland.
Sharon	Mr. J. A. Reid.
Sherodsville	Dr. J. D. Aldridge.
Sherwood	Dr. H. C. Lindersmith.
Shiloh	Dr. S. S. Holtz.
Shreve	Mr. J. R. Wachtel.
Sidney	Mr. Wm. C. Wyman.
Smithfield	Mr. Ross C. Moore.
Smithville	Dr. D. H. Morgan.
Somerset	Dr. O. L. Iden.
Somerville	Mr. L. W. Randall.
South Bloomfield	Dr. C. E. Blacker.
South Brooklyn (See Brooklyn P. O.)	
South Charleston	Dr. Thos. G. Farr.
South Lebanon	Dr. A. D .Spence.
South Point	Dr. James Black.
South Salem	Dr. E. C. Lumbeck.
South Solon	Dr. W. H. Queen.
South Webster	
Sparta	Mr. S. G. Fowl.
Spencerville	Mr. Fred Hirn.
Springborough	Mr. John B. Blake.
Spring Hills (Hamlet)	Mr. Quincy T. Eleyet.
Spring Valley	Mr. Arch Copsey.
St. Bernard	Mr. Henry J. Nailor.
St. Clairsville	Dr. S. L. West.

St. Marys	Dr. B. E. Thomas.
St. Paris	Dr. C. A. Offenbacher.
Stewart	Mr. G. H. Hawk.
St. Louisville	
Stockport	Mr. M. C. Riley.
Strasburg	Dr. J. C. Schutzbach.
Stouts	Dr. S. B. Grimes.
Stoutsville	
Stryker	Dr. C. F. Mignin.
Summerfield	Mr. A. G. Wharton.
Sugar Grove	Dr. S. Renshaw.
Sunbury	Dr. G. H. Gerhardt.
Swanton	Mr. Frank Minnick, Clerk.
Sycamore	Dr. W. H. Wickham.
Syracuse	
Sylvania	Mr. George A. Crandall.
Tarlton	Mr. J. B. Grove, Clerk.
Taylorsville (See Philo P. O.)	
Tippecanoe City	Mr. K. H. Heikes.
Tiltonville P. O. (Grover)	
Tiro	Dr. W. H. Guiss.
Thornville	Dr. W. T. Stevens.
Thurman	Dr. Gomer E. Jones.
Thurston	
Tontogany	Mr. E. G. Gill.
Toronto	Mr. Thomas Brown.
Trimble	Dr. H. D. Danford.
Trinway	Mr. Leroy Rose.
Tuscarawas	Mr. M. A. Romig, Mayor.
Union City (Ind.)	Dr. J. E. Detamore.
Uniontown (See Fultonham P. O.)	
Unionville	
Unionville Center	Dr C. O. McCune.
Uhrichsville	Dr. James A. McCollam.
Utica	Dr. G. W. Garrison.
Upper Sandusky	Dr. G. O. Maskey.
Van Buren (Hamlet)	Mr. D. H. Heistand, Mayor.
Vandalia	Dr. W. H. Riley.
Vanlue	Dr. Jas. L. Schrotz.
Van Wert	Dr C. G. Church.
Vermillion	Mr. B. S. Horton.
Versailles	Dr. C. F. Ryan.
Vinton	Mr Joel A. Pugh.
Wadsworth	Dr. C. N. Lyman.
Waldo	Dr. Robert S. Dombaugh.
Wapakoneta	Mr. A. Kohler.
Warsaw	Mr. S. W. Willis.
Washington	Mr. S. B. Lawrence.
Washingtonville	Mr. Wm. Holt.
Waterloo (See Pancoastburg P. O.)	
Waterville	Mr. H. T. VanFleet.
Wauseon	Mr. D. C. Teeter.
Waverly	Mr. James J. Emmitt.
Waynesburg	Dr. E. G. McCormick.

Waynesfield	Dr. F. M. Berry.
Waynesville	Dr. H. Q. Alexander.
Webster	Mr. J. F. Byrd.
Wellington	Dr. R. G. Holland.
West Alexandria	Mr. R. C. Hill.
West Cairo	Dr. Geo. W. Henderson.
West Carrollton	Mr. Geo W. Deemer.
West Chester	
West Elkton	Dr. Elwood Holaday.
Westerville	Mr. T. A. Conklin.
Western Star	Mr. Fred Becker.
West Jefferson	Mr. W. R. Borland.
West Leipsic	Mr. M. L. Pritchard.
West Liberty	Dr. R. M. Fulwider.
West Manchester	Mr. E. M. Wysong.
West Mansfield	Dr. C. W. Albright.
West Middleburg	
West Mill Grove	
West Milton	Dr. Gainor Jennings.
West Salem	Dr. D. W. Carver.
Weston	Dr. J. W. Williams.
West Union	Dr. James W. Bunn.
West Unity	Mr. J. H. Tiddler.
Wharton	Mr. B. W Lee.
White House	Mr. W. K. Jones.
Wilkesville	Dr. G. W. Martin.
Williamsburg	Dr. J. P. Allen.
Williamsport	Mr. C. D. Briner.
Windham	Mr. H. J. Higby.
Willoughby	Dr. Geo. B. Durban.
Willshire	Mr. S. K. Christy.
Wilmington	Dr. A. T. Quinn.
Wilmot	Mr. O. Curtis Ricksecker.
Winchester	Mr. Alfred Johnson.
Winton Place	Mr. G. C. Wildman.
Woodsfield	Mr. A. S. Baker.
Woodstock	Mr. Daniel S. Poling.
Woodville	Mr. F. L. Nieman.
Worthington	Dr. D. H. Welling.
Wyoming	Mr. Geo. Stoddard.
Yellow Springs	Mr. Isaac Loe.
Zanesfield	Dr. C. M. Wanzer.
Zaleski	
Zoar	Mr. Chas. J. Breymeir.

A REPORT

UPON THE

Sanitary Condition of School Buildings

IN

Cities and Villages in Ohio.

A REPORT UPON THE SANITARY CONDITION OF SCHOOL BUILDINGS IN CITIES AND VILLAGES IN OHIO.

The sanitary condition of our school buildings is a matter of much public concern. More than 830,000 children occupy these buildings during a considerable part of the year for a period of 8 to 10 years or more. At this growing period of their lives they are particularly susceptible to unsanitary surroundings. They are forced into these buildings by the laws of the state. Justice demands that they be protected in their physical well-being in every way possible.

Great improvements have undoubtedly been made in the sanitary arrangements of school buildings erected within recent years. It is nevertheless true that essential requirements are still neglected. Even where skilled architects are employed to prepare plans for school buildings, they are often unable to carry out their ideas as to their interior arrangement. A school building properly planned may be constructed, and the ends of school hygiene be defeated by overcrowding. A school room with floor space, air space and arrangements for ventilation for forty pupils, may in time have sixty pupils crowded into it.

The State in no way controls the construction of school buildings. This is left to the wishes or fancies of individual school boards. It is not to be expected that the members of such board will be properly informed of the hygienic requirements for a healthful school building, nor, in many cases, realize the necessity for even the most highly essential things.

It is high time for the State to assume charge of this matter. It should either enforce certain needful regulations in the construction of all school buildings, and in their use, as in the matter of preventing overcrowding, for example, or should create some competent authority to which all plans for school buildings should be referred for approval.

Believing that the necessity for such action would be shown by a report upon the sanitary condition of school houses already erected under present laws, the State Board of Health requested the boards of health of cities and villages to examine and report upon all school buildings within their jurisdiction. The "country school house," located outside of municipalities, was not investigated. Accordingly the following letter and list of questions was sent to the boards of health of all cities and villages:

OHIO STATE BOARD OF HEALTH,

OFFICE OF THE SECRETARY,

COLUMBUS, December 20, 1901.

To the Health Officer:

DEAR SIR:—The law provides for an annual report from the local board of health to the State Board of Health. Instead of the usual report upon the sanitary condition in general of cities and villages, we have decided to ask for a special report upon the sanitary condition of school buildings.

Section 2135, of the Revised Statutes, provides that "The board of health is hereby required to inspect semi-annually, and oftener if in the judgment of the board it shall be deemed necessary, the sanitary condition of all schools and school buildings within its jurisdiction." The influence of school life on the health of children is marked, and no one will question the wisdom of requiring boards of health to frequently look into the sanitary condition of school houses.

The enclosed questions, which you are requested to answer as fully as possible, cover the most essential features of school sanitation Special conditions will doubtless be found in some buildings that should be fully noted. One blank should be devoted to each school house. If a sufficient number of blanks have not been furnished you, please write at once stating the number of extra blanks needed. Reports must be sent in not later than February 1st, in order to have them included in the report of the State Board of Health to the Governor. It is greatly desired that special attention be given to answering correctly question five. By "window area" is meant the area of window glass in all windows combined. The dimensions of rooms should not be estimated, they should be accurately measured. There should also be an actual measurement of the amount of window space in each room. A record of your examinations should be filed with your own board for future reference. If you desire duplicate blanks for that purpose they will be sent to you upon request.

Whenever there is reason to suspect pollution of the water used at the school, the State Board of Health, if requested, will have a chemical and bacteriological examination of it made, free of charge except expressage on samples. All samples must be sent in bottles furnished by us.

Hoping to have your active aid in this investigation of the sanitary condition of school buildings, I beg to remain, Very truly yours,

(Signed) C. O. PROBST, M. D.,

By order of the Board. *Secretary.*

QUESTIONS.

1. Name and location (street) of school house.
2. Character of soil.
3. Material (wood, brick).
4. Number of stories.
   Number of school rooms.
5. Dimensions (length, width and height), total window area, and average attendance for each room.
6. Do the scholars of any room have to *face* windows?
7. What is the system of heating?
8. What is the system of ventilation?
9. Is a bad odor observable in any of the rooms?
10. What closet accommodations are provided (water closets, indoor or outdoor privies)?

11. What is their condition?
12. Is the basement clean, well lighted and dry? Specify defects, if any.
13. If any extra precautions are needed to guard against fire, state them.
14. Are any changes in doors, stairs, etc., required to provide better exit in case of fire? If so, what?
15. What is the source of drinking water used in the school?
16. If from a well, cistern or spring, state whether it is liable to pollution, and source of pollution.
17. What is the area in square yards of the school house playground?
18. Is there any other ground nearby used for this purpose?
19. Note any other unsanitary conditions, not mentioned above.
20 Recommendations for bettering the sanitary condition of this school building.

It is to be regretted that some of the boards of health, although a second request was made, failed to report. Information was received, however, concerning 966 school buildings containing 5,971 rooms. It may be safely assumed that these fairly represent the average condition of school buildings throughout the state.

The responses to the most essential points of the inquiry have been summed up in the tables which follow. It will be noted that there is the the greatest diversity in the interior arrangement of school buildings, and that defective ventilation, overcrowding and especially bad lighting, are to be found in a large number.

Mr. Edward R. Shaw, Professor of the Institute of Pedagogy, New York University, in his recent valuable book on School Hygiene says: "The size of the school-room is dependent upon several factors. Certain conclusions with reference to its size have at last been reached, and these conclusions have been so thoroughly tested and sanctioned by the most careful school men as to warrant their being regarded as standards. These standards are the results of investigations and repeated experiments, in which lighting, heating, ventilating, the needs of the child as to eye, and ear and other physical requirements, have been considered. They are the outcome of the special knowledge and recommendations of physicians, architects, and engineers, and of the practical judgment of school men, after repeated test and modification.

"These standards demand, in the first place, 15 square feet of floor space and 200 cubic feet of air space for each pupil, as the least amount of floor space and air space permissible for a school-room, when all the needs of health are fairly considered. In the second place, they demand that the size of the schoolroom should be 30 feet in length, 25 feet in width, and 13 feet in height, to accommodate not more than forty-eight pupils."

Authorities on school house construction agree that for the proper lighting of school rooms the window area should not be less than 20 per cent of the floor space. The height of windows, direction from which the light is admitted, color of walls and ceiling, while important factors in school lighting, were not inquired into. The direction from which the light is admitted was considered only as regards rooms in which pupils are obliged to face the light.

Assuming that each pupil should have not less than 15 square feet of floor space, it will be seen by Table II. that 174 school buildings, or 18 percent of the entire number reported upon, contain one or more rooms in which the floor space per capita is below 15 square feet. There are 1235 school rooms, or 21 percent of the entire number included in the report, below this requirement for floor space. In twenty-two school buildings, or 2.3 percent of the whole number, the floor space in one or more rooms is less than 10 square feet per capita.

That nearly one-fifth of our school rooms should have a floor space less than the minimum requirement of 15 square feet per capita, shows a condition of overcrowding calling for speedy corrective measures. Evidently more school buildings are needed. No motives of economy should stand in the way of removing any necessity for such injurious overcrowding.

Two hundred cubic feet of air space is taken as the minimum amount allowable for each scholar. Many authorities favor a much higher figure. If we allow a less air space than 200 cubic feet per capita it becomes impracticable to force sufficient fresh air through the room to insure proper ventilation.

Taking, then, 200 cubic feet per capita as the minimum allowable air space in the school room it is shown by Table II. that 272 school buildings, or 28 percent of the whole number under consideration, have one or more rooms below this standard. Six hundred and seventy-seven school rooms, or 11.3 percent of all, fall below 200. Twelve school buildings contain school rooms with less than 100 cubic feet per capita.

That 11.3 percent of our school rooms should be deficient in air space is a matter for serious consideration. The habitual breathing of foul air is highly detrimental to health, and especially to the health of school children. It is to be remembered that many of these rooms are poorly ventilated. With a standard school room, as given by Mr. Shaw, it requires that the air of the school room must be changed every seven minutes if each pupil is to have what may be considered a minimum quantity of fresh air, — 30 cubic feet per minute.

The influence of school life on vision is marked. Serious defects of sight, many of them irremediable, are caused by the improper lighting of school rooms. While there are several factors that contribute to these evil results, such as the use of too small letters, and the color and surface of the paper of text-books, faulty black-boards, etc., an insufficiency of light is perhaps the most potent and also the most common cause of eye troubles.

As stated above, good illumination requires that the window area shall not be less than 20 percent of the area of the floor space. Accepting this as the minimum allowable lighting area, and it will be seen by

Table II. that 729 school buildings, or 75 percent of the entire number, contain rooms below this standard. There are 434 school rooms, or 69 percent of the number reported upon, below standard. There are 215 school buildings, 22 percent of the whole number, that one or more have school rooms with window areas of ten or less than 10 percent of the floor space, and in thirty school buildings the lighting area in some rooms is but 5 percent, or less, of the floor space. The least lighting area reported is but 2 percent of the floor space.

Under "remarks" in Table I. it will be noticed that in some school buildings pupils are obliged to face the windows, the worst possible direction from which light should come.

No stronger argument could be presented for the need of some adequate control of school house construction than this showing as to the woeful deficiency in provisions for proper lighting in those already erected. It would seem, indeed, that some retroactive measures should be enacted, and that steps should be taken at once to compel the introduction of additional windows in a large number of these school buildings.

Other items of much interest will be found in Table I., such as the system of heating and ventilation, the condition of closets, source of water supply, and the size of playgrounds.

This whole question of the sanitary construction of school buildings should receive the early attention of Legislature, not only as regards buildings yet to be erected, but also as regards those now in use where sanitary requirements are so grossly neglected.

TABLE I — SCHOOL HOUSES.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Ada	Central building	brick	10	39	50	22	17	286	214	....	....
"	South Ward building	"	4	35	43	22	21	368	292	.09	.09
Alger	Main street	"	1	45	45	24	24	376	376	.08	.08
"	"	wood	3	35	45	28	18	354	275	.12	.10
Alliance	No. 1 N. Park Ave	brick	6	40	46	20	16	255	194	.18	.15
"	No. 2 Franklin Ave	"	4	46	55	17	14	211	177	.22	.22
"	No. 3 Seneca Ave	"	8	42	50	20	17	264	225	.15	.15
"	No. 5 Broadway Park	"	6	41	46	25	23	357	315	.11	.10
"	No. 6 E. State St.	"	4	37	53	27	19	386	247	.13	.11
"	High School	"	7	45	82	23	18	297	233	.18	.08
Anna	North St.	"	4	....	....	....	....	......	......	....	....
Ansonia	W. Canal St.	"	5	39	45	22	18	259	216	.11	.07
Apple Creek	Cemetery St.	wood	3	32	35	38	31	568	463	.10	.08
Arcadia	Walnut St.	brick	4	36	40	25	22	352	302	.17	.16
Arcanum	South St.	"	8	37	52	....	....	......	......	....	....
Archbold	Holland St.	"	5	38	44	20	17	269	230	.20	.17
Arlington	Madison Tp. No. 1	wood	6	31	40	26	20	326	257	.10	.09
Ashley	W. High St.	brick	5	39	52	19	14	289	203	.27	.23
Ashtabula	Catherine St.	wood	4	52	64	15	12	149	124	.13	.11
"	Columbus St.	brick	8	46	53	19	16	233	186	.19	.17
"	Division St. (High)	"	10	48	60	18	16	218	190	.17	.17
"	Division St. (Annex)	wood	4	35	40	22	13	220	130	.13	.12
"	Lake St.	brick	8	46	55	19	15	268	205	.19	.17
"	Lake St. (Catholic)	"	3	33	50	18	12	220	144	.14	.14
"	Market St. (Catholic)	wood	4	55	80	16	7	243	86	.16	.12
"	Prospect St.	brick	5	51	58	16	14	197	171	.13	.12
"	Station St.	"	4	43	45	21	20	251	238	.09	.09
"	Tyler Ave	"	2	54	60	17	15	203	184	.12	.12
Ashville	Long St.	"	4	....	....	....	....	......	......	.26	.14
Athens	Main b'ld'g	"	12	34	40	22	17	337	217	.21	.20
"	Cottage b'ld'g	"	2	45	46	16	15	219	217	.22	.22
"	High school	wood	1	57	57	24	24	358	358	.14	.14
Attica	High St.	brick	5	34	50	26	22	394	348	.15	.12
Bainbridge	....	"	6	28	40	47	32	559	389	.10	.09
Bakersville	Dover St.	wood	2	29	35	47	40	570	480	.10	.10
Barberton	High school	brick	10	44	54	22	19	286	251	....	....
"	Baird Ave.	"	4	50	59	14	12	165	154	.17	.15
"	Cornell St.	wood	3	36	40	27	23	281	252	.15	.14
"	High St.	"	2	36	36	27	26	321	308	.11	.08
"	River St.	"	1	38	38	21	21	250	250	.08	.08
Barnesville	Church St.	brick	18	33	43	25	19	327	251	.12	.11
"	High School	stone	1	84	84	21	21	321	321	.22	.22
Beaverdam	Mill St.	brick	4	35	40	18	16	221	193	.16	.16
Bedford	Washington St.	"	4	38	52	19	15	287	224	.24	.19
"	Washington St.	wood	4	29	34	13	11	198	168	.14	.12
Bellaire	4th Ward (Catholic)	brick	6	46	75	14	9	198	124	.15	.11
"	Union St.	"	4	38	46	23	19	329	266	.14	.14
"	Guernsey St.	"	4	42	50	19	16	247	206	.18	.18
"	Kelley Rose Hill	"	4	35	45	15	12	150	125	.13	.11
"	Gravel Hill School	"	6	44	45	18	17	236	229	.15	.15
"	Belmont	"	2	32	35	24	23	304	283	.17	.17
"	High School	"	9	45	72	21	16	319	218	.11	.09
"	Indian Run	"	4	44	50	20	17	293	254	.18	.18
Belle Center	Railroad St.	"	8	38	53	20	14	287	197	.23	.20
Bellevue	McKim St.	brick and wood	2	40	40	19	19	232	232	.28	.28

TABLE I — SCHOOL HOUSES.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
Smead	Smead	Smead	good	well	9,775	
"	"	"	"	"	2,254	
......	......	privies	......	"	6,050	
......	......	"	......	"	6,050	
furnace	Smead	dry closets	good	well and hyd.	900	
"	"	"	"	"	333	
steam	shaft	closets	"	hydrant	1,000	
"	"	"	"	well and hyd.	555	
furnace	"	privies	"	well	933	
"	fan	closet	"	well and hyd.	177	
stoves	windows	outdoor vault	fair	well	3,000	Poor ventilation. Scholars face windows in all the rooms.
"	"	"	"	"	7,000	Scholars face windows.
"	"	outdoor priv's	"	"	7,000	
"	"	"	"	"	4,840	
steam	Note (1)	"	......	"	4,000	
hot air	Smead	dry closets	good	"	6,000	
stoves	windows	outdoor priv's	"	"	9,680	
"	"	"	foul	"	3,000	
furnace	"	Smead	good	hydrant	780	
Smead	Smead	Smead	"	"	5,700	Fire drill practiced.
"	"	"	"	"	6,164	" "
furnace	window		"	"	12,320	
Smead	Smead		"	"	3,336	" "
stoves	window	outdoor priv's	fair	well	5,390	
stove & furn.	"	"	good	hydrant	3,500	Doors open inwards.
steam & furn.	"	closets	"	"	5,340	Fire drill practiced.
Smead	Smead	Smead	"	"	2,500	" "
furnace	window	outside priv's	fair	"	2,300	" "
stoves	"	"	foul	......	......	Attend'ce not given.
steam	"	"	good	hydrant	14,000	
"	"	"	"	"	14,000	
"	window and flues	"	"	"	14,000	
furnace	windows	"	"	"	550	
steam	"	"	fair	wells	9,680	
stoves	"	"	"	"	2,420	
steam	fan	"	good	"	3,100	
"	"	"	"	"	3,100	
stoves	windows	"	"	"	1,000	
"	"	"	"	"	......	
"	"	"	"	"	2,100	
steam	"	"	"	"	12,900	
"	"	"	fair	"	......	
stoves	"	"	"	"	8,550	
steam	transom and windows	"	good	"	4,800	
furnace	window	"	"	"	4,800	
steam	"	outdoor & indoor closets	"	hyd. and well	......	
"	window & flue	outdoor clos's	"	hydrant	820	
stoves	"	"	"	"	700	
furnace	windows	"	"	"	4,800	
"	"	"	"	"	1,000	
stoves	"	"	"	"	......	Scholars face windows.
steam	flues and windows	"	"	"	1,475	
furnace	flues and windows	outdoor priv's	poor	"	1,200	
Smead	Smead	indoor	fair	well	10,000	
furnace	window	outdoor priv's	"	cistern	3,200	

Note (1). Cold air ducts leading up through radiators.

TABLE I — SCHOOL HOUSES — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Bellevue	New Central b'ld'g	brick and stone	8	41	50	21	19	247	228	.20	.19
"	Old Central b'ld'g	brick	5	38	45	22	17	280	223	.12	.09
"	Pike b'ld'g	"	4	35	35	18	17	211	199	.23	.21
Bellville	School St.	"	8	40	40	23	20	230	201	....	....
Belmont	Market and John Sts.	"	3	46	60	29	11	353	134	.08	.06
Benton Ridge	Market St.	"	2	50	50	16	16	239	239	.21	.20
Berlin	E. Main St.	"	4	43	52	21	17	291	242	.08	.08
Bethel	Union St.	"	5	40	40	22	16	262	188	.12	.12
Bettsville		"	4	21	25	41	30	494	360	.14	.13
Beverly	Fifth St.	"	4	32	45	31	26	469	397	.22	.20
Blanchester	Main St.	"	10	....	....	....	....	......	......	.20	.15
Bloomingburg	"	"	5	32	50	20	10	349	183	.13	.09
Bloomville	High St.	"	4	37	49	21	16	368	278	.20	.20
Bluffton	Jackson	"	11	40	60	17	11	249	168	.16	.15
Bond Hill	Maple Ave.	"	5	37	60	20	10	231	115	.16	.12
Bowling Green	Main and Palmer Ave	"	4	32	33	26	25	363	346	.35	.35
"	Grove Ave.	"	....	....	....	....	....	......	......	....	....
"	Rig St.	"	4	33	38	25	21	344	301	.35	.35
Bradford	School St	"	8	41	50	21	17	276	228	.11	.11
Bradner	Leightner St.	"	5	49	60	22	16	270	200	....	....
"	rented b'ld'g	"	1	45	45	18	18	180	180	....	....
Bridgeport	Bet. Whitney & Bennett	"	9	50	65	22	18	321	198	.24	.20
"	Lincoln Ave.	"	4	31	36	23	19	285	187	.18	.11
"	West End b'ld'g	"	4	46	53	17	15	213	177	.14	.14
"	Pike St.	"	4	41	49	21	17	268	206	.23	.23
Bryan	Cherry St.	"	2	45	45	24	24	336	336	.20	.20
"	Butler St.	"	4	48	48	16	16	226	226	.18	.18
"	Walnut St.	"	2	43	43	19	19	264	264	.19	.19
"	Central b'ld'g	"	8	45	45	24	24	326	326	.13	.13
Buchtel	Ray St.	wood	4	63	89	16	12	188	139	.16	.15
"	Marietta Ave.	brick	2	32	39	....	....	......	......	....	....
Bucyrus	Plymouth St.	"	4	45	45	18	18	213	213	.17	.16
"	Cemetery St.	"	4	43	48	18	16	214	192	.17	.17
"	Middletown St.	"	18	45	55	22	21	268	268	.12	.09
Burbank	Church and Mill Sts.	wood	2	28	30	34	32	420	384	.09	.09
Butler	College St.	brick	4	36	42	20	17	259	225	.11	.11
Byesville	High St.	wood	6	64	90	14	10	173	115	.12	.11
"	Race St.	"	1	57	57	11	11	136	136	.13	.13
Cadiz	E. Market St.	brick	8	47	47	20	20	306	286	....	....
"	S. Ohio St.	"	2	34	38	48	43	667	597	.07	.07
Caldwell	Main St.	"	6	36	40	25	23	378	345	.12	.11
Caledonia	N. High St.	"	4	39	50	20	14	263	180	.31	.15
Cambridge	Central b'ld'g	"	10	39	48	27	22	398	306	.13	.11
"	West b'ld'g	"	8	43	53	19	15	263	205	.18	.18
"	South b'ld'g	"	12	38	48	20	16	264	210	.17	.16
"	East b'ld'g	"	8	44	50	18	15	237	204	.19	.19
Camden	Central Ave.	"	6	25	34	32	21	414	277	.14	.10
Canal Dover	Second St.	"	7	35	35	26	26	360	360	.14	.14
"	South Ave.	"	4	35	35	26	26	360	360	.14	.14
"	Oak Grove	"	18	37	70	17	16	212	197	.20	.20
Canal Fulton	High School b'ld'g	"	6	44	52	....	....	......	......	....	....
Canal Winchester	South Washington	"	6	33	50	13	11	161	128	.15	.10
Canton	East Fifth St.	"	6	40	40	25	25	352	346	.12	.07
"	N. Cherry St.	"	12	45	45	20	20	300	300	.13	.13
"	E. Eighth St.	"	8	37	62	22	14	309	192	.25	.19
"	Deuber Ave	"	8	44	51	21	17	285	246	.19	.19
"	Garfield Ave	"	8	32	44	26	19	359	265	.23	.23
"	Immaculate Conception	"	4	55	60	15	14	208	195	.13	.11
"	St. Johns	"	5	52	56	17	16	240	223	.20	.20

TABLE I — SCHOOL HOUSES — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
furnace	fan	Note (2)	good	hydrant	4,800	
Smead	Smead	outdoor priv's	fair	"	4,800	
furnace	flues	"	"	cistern	2,400	
"	Patrick	"	good	well	12,000	
stoves	window	"	poor	" Note (3).	1,600	Poor light.
"	"	"	fair	"	4,800	
water	window & flue	"	"	"	3,800	Poor light.
stoves	windows	"	"	"	4,400	
"	"	"	bad	"	3,600	
Patrick	Patrick	"	good	"	10,000	
furnace	cold air ducts	closets	"	hydrant	10,000	Doors open inwards.
stove	windows	outdoor priv's	"	well	420	
steam	windows	"	"	cistern	8,300	
Smead	Smead	indoor clos'ts	"	wells	12,000	Well arranged b'd'g
Grossin's	Grossin's	outdoor priv's	"	well, cistern and hydrant	7,000	Doors open inwards.
Smead	Smead	closets	"	hydrant	4,500	
"	"	"	"	"	18,000	
"	"	"	"	"	4,500	
steam	windows	outdoor priv's	"	well	45,000	
Smead	Smead	Smead	"	"	15,000	
stove	windows	outdoor priv's	"	"	1,500	
"	"	"	fair	hyd and wel	9,500	
"	"	"	good	hydrant	1,100	
furnace	Smead	"	"	"	4,000	
Smead	"	Smead	"	well	2,600	
stoves	windows	outdoor priv's	"	"	4,800	
"	"	"	"	"	4,800	
"	"	"	"	"	10,000	
Smead	Smead	Smead	"	"	40,000	
stove	window	outdoor priv's	"	"	9,500	
"	"	"	"	"	5,000	
steam	flue & window	"	"	"	6,700	
Smead	Smead	Smead	"	"	4,000	
steam	flue & window	outdoor priv's	"	"	14,000	
stoves	windows	"	"	"	9,500	
hot air	registers	"	fair	"	5,800	
stoves	windows	"	good	"	2,300	
"	"	"	"	"	highway	Face windows.
steam	"	"	"	hydrant	36,000	
steam and grates	"	"	"	"	2,000	Poor light.
stoves	"	"	"	well	4,800	
"	"	"	"	"	9,000	
Smead	Smead	Smead	"	"	3,600	
"	"	"	"	"	4,000	
"	"	"	"	"	2,100	
"	"	"	"	"	5,200	
stoves	windows	outdoor priv's	"	"	4,400	
Peck-Williamson	Peck-W'mson	Peck-W'mson	"	"	8,000	
Smead	Smead	Smead	"	"	8,000	
"	"	"	"	"	10,000	
"	"	"	"	"	13,000	
stoves	windows	outdoor priv's	fair	"	6,000	
steam	"	closets	good	hydrant	4,000	
"	shaft	"	"	well	1,000	
"	windows	outdoor priv's	"	hydrant	2,800	
Smead	Smead	Smead	"	"	1,100	
"	"	"	"	"	2,000	
steam	windows	outdoor priv's	"	well	5,000	
"	shaft	closets	"	hydrant	700	

Note (2). Indoor Dixon crematory.
Note (3). Dug well 200 feet from grave-yard.

Table I — School Houses — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Canton	Woodland Ave.	brick	8	36	44	24	20	329	276	.16	.16
“	Clarendon Ave.	“	6	38	45	24	20	331	277	.18	.18
“	Liberty St.	“	9	40	49	19	10	260	142	.20	.12
“	McKinley Ave.	“	13	40	55	20	12	287	175	.20	.15
“	High School	“	16	35	46	25	16	390	245	.20	.09
“	Hartford St.	“	7	30	36	29	24	430	360	.16	.16
“	W. North St.	“	8	50	63	24	16	263	218	.18	.16
“	Crystal Park School	wood	3	33	37	27	24	269	249	.14	.13
“	Market St.	brick	13	44	50	19	10	285	154	.13	.11
“	St. Peters	“	6	50	50	20	20	277	277	.17	.17
“	E. Fourth St.	“	8	40	40	22	22	302	302	.18	.18
Carey	South St.	“	7	40	47	20	17	248	213	.13	.13
Carlisle	Main St.	wood	4	26	32	29	23	338	281	.19	.19
Carroll	High St.	brick	4	22	25	40	35	477	415	.06	.06
Carrollton	....	....	....	....	....	....	....	....	....	....	....
Carthage	Fifth St.	brick	10	39	50	20	16	257	203	.24	.22
“	2d and Jackson	“	3	44	48	18	16	232	211	.18	.15
Catawba	North St.	“	3	23	27	31	23	341	253	.13	.12
Cecil	N. Main St.	“	2	45	45	17	17	170	170	.19	.18
Cedarville	Xenia Ave.	“	8	31	44	21	15	293	210	.18	.18
Celina	E. Wayne St.	“	5	31	43	26	18	334	239	.18	.18
“	High School	“	7	34	45	32	25	442	348	.17	.16
Centerburg	Preston St.	“	5	35	45	22	20	291	257	.10	.09
Chagrin Falls	Philomethean St.	“	9	....	....	....	....	....	....	.18	.10
Chesterhill	Chesterhill Special	“	4	30	30	26	26	340	313	.13	.13
Chicago	Park St.	“	11	41	60	20	12	231	96	.15	.08
Chickasaw	State St.	“	2	....	....	....	....	....	....	....	....
Chillicothe	High school	“	7	36	38	20	15	250	162	.14	.12
“	Western b'ld'g	“	12	38	80	19	9	290	131	.16	.15
“	Eastern b'ld'g	“	18	41	61	19	13	248	162	.16	.13
“	Central b'ld'g	“	7	34	50	21	16	229	192	.20	.20
“	Southern b'ld'g	“	6	28	38	24	18	310	226	.13	.13
“	Old High school	“	4	39	50	19	14	232	163	.12	.09
“	Jackson Ave.	“	8	45	67	18	12	213	143	.18	.18
Circleville	Walnut School	“	4	25	33	29	23	382	265	.20	.20
“	E. High St.	“	6	27	40	27	18	386	258	.19	.18
“	Court St.	“	18	34	47	25	19	339	242	.10	.06
“	Franklin St.	“	8	28	35	26	22	348	288	.27	.25
“	St. Joseph's St:	“	4	35	50	21	21	294	294	.23	.16
Clarksville		“	4	35	46	21	16	284	212	.19	.19
Cleveland Heights	Noble St.	stone	1	30	30	23	23	350	350	.10	.10
“	Fairmont St.	wood	1	20	20	27	27	324	324	.20	.20
Cleves		brick	6	37	50	28	20	418	307	.15	.14
Coal Grove		wood	4	52	75	11	8	124	96	.23	.21
College Hill	Ohio Military Institute	brick	1	50	50	36	36	574	574	.10	.10
“	Public School	“	6	40	50	23	11	311	245	.16	.14
Collinwood	Central	“	4	45	50	19	17	219	199	.12	.10
“	High School	“	7	49	65	26	20	366	276	.17	.14
Columbiana	Pittsburg St.	“	7	50	60	29	13	258	144	....	....
Columbus	Sullivant Annex	“	2	24	30	38	32	463	421	.13	.12
“	Highland Ave. Annex	“	1	25	25	20	20	196	196	.34	.34
“	Front and Long	“	15	40	40	20	9	235	106	.08	.07
“	East High	brick	....	....	....	....	....	....	....	....	....
“	Fulton St.	“	12	41	50	27	16	292	208	.13	.11
“	Sichert St.	“	10	35	42	21	12	246	124	.21	.18
“	Medary School	“	9	35	45	23	18	313	231	.22	.21
“	Fifth Ave.	“	14	47	47	15	9	202	129	.21	.19
“	Twenty-third St.	“	12	40	51	20	17	268	220	.15	.14
“	Felton Ave.	“	16	33	43	23	17	294	225	.36	.33
“	Garfield School	“	17	38	45	20	19	281	259	.20	.20
“	South High	“	13	31	43	21	7	294	98	.34	.24
“	Fieser School	“	13	37	50	21	11	310	152	.19	.14
“	Third St.	“	8	40	47	17	15	244	218	.18	.17
“	Southwood Ave.	“	8	40	49	26	21	416	335	.14	.13
“	Douglas	“	15	39	51	18	8	259	120	.19	.18

TABLE I — SCHOOL HOUSES — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
hot air	shaft	closets	good	hydrants	3,500	
Bartlett	“	“	“	“	1,700	
Smead	Smead	Smead	“	“	250	
steam	shaft	closets	“	“	2,200	
Smead	Smead	“	“	“	none	
hot air	shaft	“	“	“	4,500	
steam	window	“	“	“	1,750	
hot air	“	outdoor priv's	“	“	700	
“	fan	closets	“	“	1,800	
steam	shaft	“	“	“	4,450	
“	“	“	“	“	4,000	
Smead	Smead	Smead	fair	“	15,000	
stove	windows	outdoor priv's	foul	wells	1,250	
“	“	“	good	well	2,625	
....	....	....	....	....	....	
steam	windows	“	fair	hydrant	6,300	
stoves	“	“	good	“	350	
furnace	“	“	bad	well	3,700	
stove	“	“	good	“	6,200	
furnace	registers	“	fair	“	3,200	
stoves	windows	“	“	....	....	
“	“	“	“	....	3,333	
furnace	“	“	good	well	7,300	
“	flues	“	....	....	....	
stoves	windows	“	good	well	1,600	
steam	flues	“	“	hydrant	5,200	
stoves	windows	“	“	well .!	1 square	
hot air	fan	closets	“	hydrant	none	
steam	windows	outdoor priv's	“	“	30,000	Scholars face windows.
Smead	Smead	Smead	“	“	7,000	
stoves	windows	outdoor priv's	“	“	5,000	
“	“	“	“	“	4,000	
“	“	“	“	“	5,000	
Peck-W'mson	Peck-W'mson	“	“	“	4,000	
furnaces	?	closets		“	3,750	
steam	?	outdoor priv's	“	“	2,365	
“	?	closets	“	“	15,000	
“	?	outdoor priv's	“	“	1,815	
hot air	windows	“	“	“	862	
furnace	pipes	“	“	well	3,872	
stove	windows	“	“	“	7,260	
“	“	“	“	“	4,840	
“	“	“	“	cistern	6,600	
“	“	“	“	“	200	
steam	“	closets	“	hydrant	48,000	
furnace	shaft	dry closets	“	hyd. & cist'ns	16,940	
stoves	windows	outdoor priv's	bad	well	1,000	
Smead	Smead	Smead	good	“	6,000	
“	“	outdoor priv's	“	hydrant	1,800	
stove	windows	“	“	well	5,725	
“	“	“	“	“	none	
steam	registers	Smead	very bad.	hydrant	1,800	
....	....	....	....	....	....	
Smead	Smead	closets	good	hydrant	33,200	Some doors open inwards.
“	“	“	“	“	2,730	
“	“	Smead	“	well	1,870	
“	“	“	very poor.	hydrant	2,500	
“	“	outdoor priv's		“	1,850	Doors open inwards.
hot air	gratings	closets	“	“	2,760	
steam	windows (?)	outdoor priv's	“	“	2,050	
hot air	air pipes	“	“	“	4,400	Crowded rooms.
Smead	Smead	“	fair	“	4,300	
“	“	closets	good	“	7,550	
hot air	Vogelgesang Furnace Co	“	“	“	6,500	
steam	exhaust	outdoor priv's	“	“	2,860	

TABLE I — SCHOOL HOUSES — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Columbus	Franklinton	brick	12	45	60	18	13	240	187	.19	.19
“	Main St.	“	8	30	39	28	21	392	295	.20	.19
“	Spring St.	“	8	45	55	17	14	221	179	.21	.21
“	Ohio Ave.	“	20	39	50	18	10	242	137	.23	.09
“	Park and Vine	“	12	38	42	22	19	279	231	.15	.14
“	8th and Wesley	“	12	40	47	20	17	284	230	.16	.16
“	Stewart Ave	“	12	37	52	21	15	294	213	.19	.18
“	Highland Ave.	“	8	30	36	27	22	365	289	.21	.20
“	Avondale School	“	14	39	48	21	17	276	217	.19	.12
“	Central High	“	14	44	71	20	16	267	219	.09	.03
“	Sullivan	“	17	43	52	20	16	277	229	.16	.14
“	Chicago Ave.	“	11	40	57	19	14	246	175	.17	.12
“	Peck St.	“	9	47	52	16	15	195	163	.21	.14
“	Mound St.	“	13	38	45	24	12	333	163	.16	.16
“	First Ave.	“	13	44	44	16	14	208	194	.22	.20
“	Hubbard Ave.	“	17	40	40	19	8	250	109	.13	.17
“	Rich St.	“	6	41	47	17	15	225	184	.13	.13
“	Fourth St.	“	2	38	42	40	29	680	343	.15	.13
“	“	“	7	39	46	19	16	250	211	.14	.13
“	Fair Ave.	“	12	41	48	20	17	263	224	.18	.18
“	Ninth Ave.	“	8	41	48	19	17	260	217	.18	.09
“	Second Ave.	“	12	48	48	15	13	197	178	.18	.17
“	North High	“	13	40	40	20	18	284	254	.21	.16
“	Northwood Ave.	“	8	36	51	22	16	313	220	.16	.14
Columbus Grove	Liberty	“	10	38	50	19	12	229	157	.12	.09
Commercial Point		“	3	33	40	45	45	544	453	.05	.05
Conneaut	Main St. Academy	“	2	62	70	17	13	182	139	....	....
“	Broad St.	“	8	54	62	16	13	238	191	.23	.22
“	North b'ld'g	wood	1	45	45	15	15	220	220	.16	.16
“	Main St.	brick	6	44	60	19	14	239	175	.22	.20
“	Harbor St.	“	4	42	52	19	15	256	213	.24	.23
Convoy	Sycamore St.	“	4	49	60	12	11	185	150	.21	.20
Corning		“	6	49	65	18	17	221	202	.15	.14
Coshocton	Sycamore St.	wood	6	32	36	26	17	333	202	.19	.17
“	High school	brick	8	37	46	23	17	316	220	.18	.10
“	Walnut St.	“	10	41	50	20	18	254	212	.12	.09
“	Cherry St.	“	4	37	40	20	19	289	262	.21	.20
Covington	High school b'ld'g	“	11	36	45	23	19	306	243	.13	.13
Crestline	St. Joseph's (parochial)	wood	2	46	52	....	....	......	......	....	....
“	East b'ld'g	brick	4	47	50	19	18	257	242	.13	.13
“	West b'ld'g	“	9	45	75	14	13	192	165	.17	.17
Creston	E. Kerr St.	wood	1	35	35	30	30	368	368	.31	.31
“	S. Main St.	“	4	39	48	31	17	373	203	.08	.08
Cridersville	High St.	brick	4	34	42	18	14	251	200	.16	.16
Crooksville	State St.	wood	4	32	45	30	21	295	210	.09	.09
“	Main St.	“	2	34	40	24	20	240	204	....	....
Croton		“	4	30	39	25	19	295	231	.11	.11
Cumberland		“	4	26	28	28	27	393	372	.03?	.03?
Cuyahoga Falls		brick	16	....	....	....	....	......	......	....	....
“	Second St.	wood	5	....	....	....	....	......	......	....	....
Dalton		brick	3	45	50	26	24	321	290	.10	.10
Danville	High School	“	4	45	45	16	16	144	144	....	....
“	Grammar school	wood	1	47	47	9	9	81	81	....	....
Dayton	Central dist.	brick	17	36	38	25	24	342	341	.19	.05
“	5th dist. Annex	wood	4	33	33	18	18	179	179	.12	.12
“	5th dist. (Main)	brick	15	30	33	23	22	332	277	.12	.12
“	7th dist. Annex	wood	4	38	38	24	24	260	260	.10	.10

TABLE I — SCHOOL HOUSES — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
Smead	?	utdoor priv's	good	hydrant	1,030	
“	ead	nead	“	“	3,725	
“	“	tdoor priv's	“	“	4,000	
“	“	sets	“	“	4,000	Very crowded.
“	“	“	“	“	2,470	
“	“	Smead	“	“	2,300	
“	“	“	“	“	2,850	
Bennett and Peck	egisters	tdoor priv's	p or	well	3,450	
Smead	Smead	sets	od	hydrant	11,110	
“	“	Smead	r	“	500	Manure pile near fresh air opening.
steam	tack	tdoor priv's	od	“	1,900	
Vogelgesang..	gister	“	“	“	2,460	
“	ogelgesang..	“	“	“	1,500	
steam	hafts	nead	“	“	14,000	
Smead	Smead	tdoor priv's	“	“	4,400	Crowded.
“	“	sets	“	“	2,780	
steam	haft	“	“	“	2,500	
Smead	mead	nead	al[1]	“	1,560	See Note (1).
“	“	“	“	“	1,500	
“	“	“	od	“	2,370	
Vogelgesang..	ogelgesang..	utdoor clos's	“	“	1,400	
hot air	mead	door priv's	“	“	6,600	
Smead	“	sets	“	“	2,500	
“	“	nead	“	“	3,000	
“	“	door clos'ts	“	“	5,430	
furnace	indows	door priv's	d	well	5,000	Dark.
“	gisters	osets	od	hydrant	1,320	
“	nead	“	“	“	1,600	
stove	indows	tdoor priv's	d	“	400	
steam	“	osets	od	“	5,035	
furnace	....	tdoor priv's	fair	“	1,200	Ventilation poor.
Kruse-Dewenter	ruse-Dewenter	ruse-Dewenter	good	well	7,500	
stoves	ndows	tdoor priv's	“	well & cister	14,500	
stoves	“	tdoor priv's	“	hydrant	8,900	
Smead	mead	nead	“	“	7,300	
water	ndows and flues		“	“	3,600	
Peck-W'mson	eck-W'mson	side	“	“	11,100	
steam	ead	tdoor priv's	“	well	2,400	
stoves	ndows	“	“	spring & hyd	350	
furnace	ndows and ues	“	“	hydrant	3,000	
steam	ndows and flues	“	“	hyd. & wells	7,500	
stove	nd ws	“	ir	well	2,000	
“	“	“	“	“	4,000	
“	“	“	or	“	2,100	
“	“	“	“	“	4,800	Very dirty
“	“	“	r	“	4,800	
“	“	“	“	“	4,200	
“	“	“	od	“	1,450	
steam	“	“	“	“	....	
stoves	“	“	“	“	....	
furnace	gisters	“	r	spring	53,600	
stoves	ndows	“	od	well	9,000	
“	“	“	“	“	[illegible]	
furnace	heated stacks.	ead	“	hydrant	[illegible]	
stoves	windows	door priv's	bad	“	3,900	Doors swing inw'ds.
furnace	stacks	“	“	“	3,900	“ “
stove	windows	“	fair	“	7,700	

Note (1). The closets in the basement are in very unsanitary condition.

TABLE I — SCHOOL HOUSES — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Dayton	7th dist. (Main)	brick	12	38	38	26	26	441	376	.20	.16
"	19th dist.	"	15	34	35	25	10	311	127	.15	.08
"	15th dist.	"	12	34	34	26	25	344	320	.16	.16
"	Steele High	stone	....	....	....	....	....	......	......	....	....
"	20th dist.	brick	16	32	32	28	28	356	356	.18	.18
"	13th dist.	"	12	35	35	23	23	274	274	.18	.18
"	12th dist.	"	14	33	34	27	13	450	229	.25	.05
"	4th dist.	"	14	33	33	19	18	294	263	.13	.09
"	8th dist (Annex)	wood	4	31	31	27	27	123	123	.14	.13
"	8th dist. (main)	brick	12	31	31	28	28	374	374	.16	.14
"	14th dist.	"	15	34	38	26	24	317	313	.14	.13
"	14th dist. (Annex)	"	5	36	39	14	8	133	75	.13	.09
"	Weaver dist	"	16	40	40	21	20	268	260	.22	.20
"	Holy Rosary	"	5	54	64	13	11	161	128	.15	.15
"	St. Marys (annex)	wood	2	63	67	11	11	137	130	.18	.17
"	St. Marys (main)	brick	6	54	65	14	11	189	134	.20	.19
"	St. John's (parochial)	wood	4	39	54	14	10	163	120	.14	.12
"	Trinity (parochial)	brick	4	53	72	13	10	153	112	.18	.18
"	Trinity (parochial) (boys).	"	4	55	72	15	12	198	150	.12	.12
"	St. Paul (Lutheran)	"	3	50	60	....	....	......	......	.20	.15
"	Notre Dame Academy	"	6	23	23	22	22	263	263	.20	.20
"	St. Mary's Institute	"	17	25	45	24	14	311	184	.08	.06
"	Christ's school	"	1	38	38	23	23	281	281	.13	.13
"	St. Joseph's (parochial)	"	5	46	54	19	15	297	231	.16	.14
"	St. Joseph's (annex)	"	3	53	60	24	18	253	222	.11	.08
"	Emanuel (parochial)	"	8	55	71	16	13	214	177	.17	.14
"	9th dist	"	15	34	35	27	16	411	250	.17	.08
"	9th dist. (annex)	wood	2	30	30	14	14	133	133	.19	.19
"	3rd dist.	brick	8	28	39	27	18	352	230	.12	.09
"	18th dist.	"	9	32	32	24	14	298	166	.19	.12
"	10th dist.	"	13	32	33	27	27	368	295	.20	.13
"	Herman Ave.	"	19	34	35	25	23	392	391	.14	.10
"	17th dist.	"	16	35	35	27	26	351	341	.16	.13
"	11th dist.	"	8	35	35	26	26	446	446	.20	.17
"	Manual training	"	6	....	....	....	....	......	......	.18	.11
"	12th dist. (annex)	wood	6	36	48	20	16	242	184	.25	.20
"	Allen dist.	brick	16	32	32	27	27	345	345	.19	.19
Defiance	Broadway	"	5	36	36	25	24	329	309	.20	.20
"	4th Ward	"	8	37	37	27	27	345	345	.21	.21
"	St. John's	"	1	52	52	15	15	183	183	.15	.15
"	English Catholic	"	3	40	40	14	14	167	167	.25	.25
"	German Catholic	....	3	47	47	12	12	173	173	.11	.11
"	Clinton St. (annex)	wood	2	46	46	10	10	124	124	.15	.15
"	Clinton St. (main)	brick	8	56	56	18	17	229	206	.14	....
"	2nd Ward	....	4	32	32	24	22	292	270	.22	.18
"	St. Paul's Lutheran	wood	1	22	22	44	44	437	437	.11	.11
De Graff	....	brick	8	38	50	20	16	283	218	.14	.12
Delaware	East b'ld'g	"	5	29	35	22	19	327	274	.25	.25
"	North Washington St.	"	5	37	43	21	17	271	220	.26	.22
"	South b'ld'g	"	8	36	40	24	19	363	276	.24	.19
"	South Henry St.	"	4	46	50	15	14	182	168	.14	.14
"	High school	"	9	41	75	31	14	423	135	.12	.09
"	West b'ld'g	"	8	34	43	21	16	291	229	.21	.21
Dellroy	....	"	4	40	45	21	19	300	288	.23	.23
Delphos	Franklin St.	"	8	36	43	22	19	292	242	.18	.18
"	Jefferson St.	"	9	31	39	23	22	305	294	.15	.10
"	South	wood	1	28	28	14	14	130	130	.10	.10
"	German	brick	4	32	43	25	19	315	242	.08	.08
"	Parcohial	"	6	40	40	18	14	264	216	.14	.14
Delta	Wood St.	brick	9	36	36	....	....	......	......	....	....
Dennison	Logan St.	wood	8	34	42	23	18	203	173	.09	.07
"	3rd St.	brick	9	37	45	28	18	284	183	.17	.16

TABLE I — SCHOOL HOUSES — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply	Area of play-ground in square yard.	Remarks.
furnace	stacks	outdoor priv's	fair	hydrant	7,700	
"	"	Smead	good	"	2,000	
"	"	"	"	"	3,532	
steam	fan	closets	"	"	none	
hot air	"	Smead	"	"	2,170	
furnaces	windows	outdoor priv's	fair	"	4,350	
"	Smead	Smead	good	"	6,100	
stoves & furn.	windows	outdoor priv's	fair	"	2,400	Some doors open inwards.
stoves	"	Smead	"	"	4,275	" "
furnace	Smead	"	"	"	4,275	
"	stacks	"	"	"	6,450	
stoves & furn.	windows	outdoor priv's	"	"	6,450	
furnace	fans	Smead	"	"	2,940	
water	stacks	outdoor priv's	"	"	2,360	Doors swing inwards.
stoves	windows	"	"	"	2,000	
"	"	"	"	"	2,000	
furnace	"	"	"	"	1,650	
stoves	"	"	"	"	250	
"	"	"	"	"	240	
furnace	stacks	Smead	good	"	500	Doors open inwards.
steam	"	closets	"	"	2,000	
"	windows	"	"	springs	sev'l acres	" "
furnace	"	outdoor priv's	fair	hydrant	750	
stoves	"	"	foul	"	921	" "
"	"	"	"	"	524	
"	"	"	fair	"	1,160	Children face windows.
steam	stacks	"	"	"	3,560	
"	windows	"	"	"	3,560	
furnace	"	"	"	"	1,825	Some doors open inward.
"	stacks	"	"	"	3,260	
"	"	Smead	good	"	5,150	
stoves	Smead	"	very bad	"	4,550	
furnace	stacks	"	good	"	2,600	
"	"	outdoor priv's	fair	"	3,300	
"	windows	"	"	"	none	
"	stacks	"	"	"	6,100	
"	fans	Smead	good	"	4,250	
"	Smead	closets	"	well	9,500	
"	"	Smead	"	"	7,000	
stove	windows	closets	"	"	2,500	
furnace	?	outdoor	"	"	2,500	
stoves	windows	"	"	"	600	
"	"	closets	"	"	25,000	
"	"	"	"	"	25,000	
steam	Smead	"	"	"	5,000	
stove	windows	outdoor	fair	"	....	
steam	....	"	good	"	4,000	
water	windows	"	"	hydrant	8,900	
"	"	"	fair	"	7,100	
"	"	"	good	"	9,700	
stoves	"	"	"	spring	8,000	
Smead	Smead	"	"	hydrant	840	
stoves	windows	"	"	"	8,100	
furnace	"	"	"	well	1,600	
Smead	Smead	Smead	"	"	6,650	1 door found locked during school hours.
stoves	"	"	fair	"	6,700	
"	windows	outdoor	good	"	110	No fire precautions.
"	Smead	Smead	fair	"	1,500	In poor condition throughout.
steam	"	"	good	"	1,950	No fire precautions.
Smead	windows	"	fair	"	9,700	
stoves	"	outdoor	good	"	none	
furnace	register	Smead	"	hydrant	5,000	

TABLE I — SCHOOL HOUSES — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Deshler		brick	8	41	57	24	19	337	262	.22	.22
Dillon		wood	1	35	35	11	11	129	129	.17	.17
“		“	1	25	25	40	40	480	480	.10	.10
Dillonvale		“	5	56	75	12	9	126	93	.14	.12
Dresden	Chestnut St.	brick	7	37	48	20	17	275	241	.19	.14
Dublin		“	4	23	32	43	24	566	308	.14	.12
Dunkirk	Main St.	“	8	34	46	25	19	332	244	.15	.15
Dupont		wood	3	38	47	24	19	287	235	.19	.19
East Cleveland	Prospect St.	brick	8	36	44	24	20	343	285	.18	.18
“	Superior St.	“	8	35	41	26	22	358	306	18	.18
East Liverpool	Central	“	18	44	60	20	14	284	165	.12	.09
“	Fifth St.	“	8	36	43	17	15	263	220	.15	.15
“	Pleasant Heights	wood	1	54	54	16	16	180	180	.14	.14
“	Gardendale Ave.	“	1	54	54	15	15	180	180	.14	.14
“	3rd St.	brick	4	....	....	....	....	......	......	.20	.16
“	East End	“	4	37	45	19	15	256	209	.25	.25
“	Horace Mann	“	8	28	38	30	23	366	275	.20	.20
“	Sheridan Ave.	wood	2	35	35	20	19	363	339	.13	.12
“	Ambrose Ave.	“	2	41	45	17	16	243	224	.19	.19
“	Trentdale	“	1	55	55	14	14	164	164	.18	.18
“	Grant St.	brick	8	39	45	18	16	260	219	.15	.14
“	West End	“	4	35	48	20	15	281	206	.19	.17
East Palestine	Wood St.	“	11	43	60	20	44	279	196	.14	.08
Eaton	South	“	4	34	35	26	25	419	404	.24	.24
“	Barrow St.	“	12	41	60	26	19	418	297	.16	.14
Edgerton	Elm St.	“	6	42	45	25	24	338	257	.10	.07
Edison		“	4	15	15	....	....	......	......	....	....
Edon	Porter St.	“	4	38	47	26	18	355	259	.22	.21
Eldorado	Main Cross	“	3	32	40	19	15	232	184	.22	.18
Elida	Main St.	“	4	42	50	26	25	395	373	.20	.20
Elmore		“	5	47	85	24	22	372	307	.11	.06
Elmwood Place	Maple St.	“	8	47	60	17	14	209	172	.14	.11
Emerson	White	wood	1	20	20	46	46	462	462	.13	.13
“	Colored	“	1	15	15	48	48	480	480	.11	.11
Elyria	High School	stone	12	42	75	31	19	411	269	.14	.07
Enon		“	4	23	28	33	25	379	295	.09	.09
“	High St.	wood	1	14	14	86	86	1,200	1,200	.18	.18
Fayette		brick	4	38	45	....	....	......	......	....	....
Felicity		“	4	35	49	30	28	583	414	.08	.08
Fern Bank		“	2	18	18	50	50	594	594	.17	.17
Findlay	Central	“	8	37	46	23	16	340	244	.12	.11
“	High	“	11	30	30	....	....	......	......	.13	.09
“	Blanchard Ave.	wood	2	30	34	19	16	242	210	.14	.12
“	Huber	brick	8	40	54	21	15	284	200	.25	.25
“	West Lincoln St.	“	4	48	50	20	18	252	228	.12	.11
“	Adams	“	4	32	43	28	21	438	323	.18	.18
“	Howard	“	8	38	51	23	17	290	220	.14	.14
“	Taylor	“	8	43	49	20	17	261	227	.14	.14
“	Strother	“	8	35	44	24	19	328	265	.24	.23
“	Crawford	“	8	39	50	21	16	306	264	.13	.12
“	McKee	“	4	38	45	22	19	305	259	.21	.21
“	Detwiler	“	4	26	20	32	29	412	377	.22	.22
“	Biglow	“	4	46	60	19	15	252	195	.16	.16
“	Hobart Ave.	“	3	26	30	34	29	525	471	.13	.13
“	St. Michael	“	5	40	61	26	13	356	180	.14	.10
Forest		“	6	43	45	21	16	296	188	.13	.12
Fostoria	Central	“	7	43	84	21	16	277	221	.16	.13
“	1st Ward	“	8	37	43	28	24	334	286	.19	.19
“	2nd “	“	4	36	40	17	15	207	185	.25	.25
“	3d “	“	6	38	46	21	17	280	210	.21	.20
“	4th “	“	4	34	36	15	14	177	168	.33	.33
“	5th “	“	4	34	40	18	15	211	178	.20	.20
“	St. Wendelin	“	4	46	60	12	9	140	108	.10	.10
Fort Jennings	Water St.	“	1	40	40	20	20	236	236	.10	.10
“	Water and 1st	wood	2	54	55	19	19	235	233	.12	.12
Frankfort	Colored	brick	1	14	14	62	62	802	802	.03?	.03?
“	White	“	5	33	37	32	27	455	373	.02?	.02?
Franklin	Main St.	“	18	....	....	....	....	......	......	....	....
Frazeysburg			6	31	40	29	22	386	300	.13	.12

TABLE I — SCHOOL HOUSES — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
water	windows	outdoor	good	well	18,000	Some doors open inward.
stove	"	"	fair	"		
"	"	"	"	"		Poorly ventilated.
"	"	"	bad	"	2,800	
steam	"	"	good	"		
stoves	"	"	bad	well & spring	3,100	Bad throughout.
Smead	Smead	"	good	well	7,000	
stoves	windows	"	bad	"	4,000	Some doors open inward.
steam	Pease	closets	good	hydrant	3,000	
"	"	"	"	"	3,500	
Smead	Smead	indoor	"	"	680	
"	"	closets	fair	"	440	Closets connected with cesspool.
stove	windows	outdoor	good	well		
"	"	"	"	"	2,300	
Smead	Smead	closets	good	hydrant	none	
"		"	fair	"	none	
Peck-W'mson	Peck-W'mson	"	good	"		
stoves	windows	outdoor	fair	"	125	
furnace	"	"	"	"	650	
stove	"	"	good	spring	50	
Smead	Smead	closets	"	hydrant		
"	"	Smead	"	hyd. & spring	2,000	
steam	windows	indoor privies	"	hydrant	1,300	
"	"	outdoor	"	"	14,000	
"	air ducts	"	"	"	¼ square	
stoves	windows	"	"	well	3,000	
"	"	"	"	"	4,800	
Smead	Smead	"	fair	"	7,000	
stoves	windows	"	bad	"	3,100	Doors open inward.
furnace	cold air duct	"	good	"	4,840	
steam	shaft	"	"	"	4,200	
furnace	Peck W'mson	closets	"	"	25,000	
stoves	windows	outdoor priv's	"	"	1,480	
"	"	"	"	"	4,000	Doors swing inw'ds.
Smead	Smead	Smead	"	"		
stoves	windows	outdoor	"	"	5,625	
"	"	"	fair	"	street	
"	"	"	good	"		
"	"	"	"	"	9,700	
"	register	"	"	cistern	50,000	
steam	fan	Smead	"	well	2,650	
Sturtevant	Sturtevant	closets	"	"	none	
Smead	Smead	outdoor	"	"	4,850	
steam	duct	Smead	"	"	6,800	
"	windows	outdoor	"	"	4,200	Doors open inward.
Smead	Smead	Smead	"	"	2,400	
furnace	"	"	fair	"	4,200	No fire precaution.
"	"	"	"	"	4,900	
"	"	"	"	"	4,900	
steam	windows	"	"	"	2,900	Storm doors obstructed in winter.
Smead	Smead	"	good	"	3,300	
"	"	"	"	"	8,880	
"	"	"	"	"	5,000	
"	"	"	"	"	1,780	
furnace	duct	outdoor	"	"	4,450	Doors open inward.
steam	windows	"	"	"	2,500	
"	"	closets	"	"	22,000	
furnace	Peck-W'mson	"	"	"	7,100	
"	Smead	Smead	"	"	1,100	
"	"	"	"	"	1,900	
"	"	"	"	"	6,430	
"	"	"	"	"	3,100	
steam	windows	outdoor	"	"	570	
stoves	"	"	fair	"	6,000	Poorly ventilated.
"	"	"	"	"	6,000	"
"	"	"	bad	"	900	
"	"	"	"	"		In bad sanitary condition.
furnace	"	"	fair	hydrant		
stoves	"	"	good	well	6,000	

Table I — School Houses — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Fredericktown	....	brick	6	34	45	25	18	320	231	.19	.18
Freeport	....	“	4	....	....	....	....	....	....	....	....
Galion	Lutheran (parochial)	“	2	31	41	21	19	249	221	.09	.07
“	St. Joseph (parochial)	“	2	32	35	26	18	286	210	.15	.15
“	North	“	3	36	40	19	17	211	198	.24	.22
“	East	“	6	41	52	18	15	258	207	.20	.19
“	West	“	14	45	100	26	23	330	227	.12	.11
“	South	“	4	37	47	18	14	207	168	.25	.24
“	St. Patricks (parochial)	wood	2	42	44	16	16	193	191	.18	.17
Gallipolis	High	brick	4	40	55	28	28	395	392	.21	.19
“	Grant	“	3	35	35	21	17	251	197	.25	.21
“	Lincoln	“	6	33	35	21	20	252	240	.26	.26
“	Washington No. 1	“	8	42	45	24	22	309	288	.27	.27
“	Washington No. 2	“	9	41	102	25	17	301	206	.18	.08
“	Garfield	“	3	37	38	16	16	195	190	.23	.23
Geneva	High	“	6	36	100	34	26	480	391	.20	.16
“	Eagle St.	“	9	35	45	27	20	336	253	.20	.18
Georgetown	....	“	9	32	43	22	17	303	234	.20	.20
Germantown	....	“	10	28	43	37	25	567	371	.07	.07
Girard	High	“	3	50	55	24	15	344	212	.18	.13
“	Main St.	“	4	44	49	21	16	294	198	.22	.19
“	High St.	wood	1	51	51	18	18	246	246	.22	.22
“	Market and Abbey	“	2	52	55	15	14	208	199	.21	.21
Glendale	Congress Ave.	brick	6	31	44	26	22	332	284	.17	.17
Glouster	Cherry St.	“	8	40	40	26	26	324	324	.70?	.70?
“	Republic St.	wood	4	45	50	27	24	269	240	.08	.08
Grafton	Mechanic St.	brick	6	35	46	21	16	249	188	.26	.26
Grand Rapids	....	“	4	36	48	25	19	400	300	.15	.12
Granville	....	“	7	35	47	22	17	280	221	.23	.23
Gratis	Main St.	“	4	25	25	....	....	....	....	....	....
Graysville	....	wood	2	30	40	26	18	239	176	.10	.10
Green Camp	....	brick	4	25	37	30	20	545	365	.19	.19
Greenfield	Central	“	15	37	44	....	....	....	....	....	....
“	South Side	“	4	36	41	....	....	....	....	....	....
Greenspring	N. Broadway	“	5	36	42	27	16	331	210	.14	.12
Greenville	West 4th St.	“	12	32	41	20	14	262	184	.14	.10
“	High	“	10	42	60	24	19	328	262	.13	.09
“	North	“	4	33	35	23	21	415	386	.23	.23
“	St. Marys (parochial)	“	2	45	45	32	32	384	384	.10	.10
Greenwich	Seminary St.	“	4	49	52	18	17	282	266	.17	.17
Groveport	High	“	5	28	34	30	24	358	288	.19	.16
Grover Hill	....	wood	4	49	50	24	18	286	216	.36	.25
Hamden	Church St.	brick	5	39	60	....	....	....	....	....	....
Hamilton	4th Ward	“	14	37	45	25	13	323	189	.17	.11
“	Central High	“	9	....	....	....	....	....	....	.18	.12
“	Columbian	“	8	38	45	20	17	286	244	.25	.25
“	2nd Ward	“	12	38	49	24	18	333	252	.14	.12
“	Straub	“	8	37	41	22	20	283	254	.24	.24
“	5th Ward	“	14	41	48	21	17	254	203	.13	.12
“	3rd Ward	“	8	40	46	20	17	282	244	.22	.22
Hamler	....	“	3	41	55	17	13	200	151	.11	.11
Hanging Rock	Center St.	“	4	40	40	20	20	326	326	.15	.15
Hanover	....	“	3	25	35	58	31	691	370	.15	.15
Harrod	....	“	3	37	37	28	28	614	614	....	....
Hartwell	Woodbine Ave.	“	10	41	52	18	14	245	184	.18	.09
Haskins	Maple and Middleton	“	3	32	35	27	25	383	353	.12	.12
Hicksville	Main and Smith	“	12	43	50	17	14	221	188	.22	.18
Higginsport	4th and Jackson	“	6	30	30	30	30	478	478	.22	.22
Hillsboro	Washington	“	11	40	40	19	18	267	252	.21	.14
“	Webster	“	8	36	43	26	21	361	299	.17	.17
“	Lincoln	“	3	33	35	17	16	242	230	.28	.28
Holgate	Wilhelm and Frazier	“	6	44	55	20	16	241	194	.33	.33
Hollansburg	....	“	3	24	36	30	22	385	283	.21	.19

TABLE I — SCHOOL HOUSES — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
Smead	Smead	outdoor	good	well	35,400	
stoves	windows	"	fair	"	street	
"	"	closets	bad	"	340	
furnace	"	"	"	"	1,000	Pupils face windows.
steam	"	"	good	hydrant	380	
"	"	".	fair	hyd and well.	900	
"	"	Smead	good	hydrant	600	
"	"	"	"	well	9,700	
"	"	closets & privies	"	"	1,250	
"	"	closets & privies	"	hydrant	4,000	
stoves	"	outdoor	"	"	2,400	
furnace	"	"	"	"	2,000	
steam	Smead	"	"	"	10,000	
Smead	shaft	"	"	"	10,000	
stoves	windows	"	"	"	2,500	
steam	Smead	"	bad	well	50,000	
"	gravity	"	"	"	50,000	
Peck	windows	closets	good	"	3,600	
Peck-W'mson	Peck-W'mson	outdoor	"	"	10,000	
Smead	Smead	outdoor priv's	"	"	4,000	
stoves	windows	outdoor	fair	"	3,150	
"	"	"	"	"	370	Poorly ventilated.
"	"	"	bad	"	5,000	Well liable to pollution.
furnace	fans	closets	good	"	....	
"	windows	outdoor	fair	cistern	street	
stoves	"	"	"	well	10,000	
Smead	Smead	Smead	good	"	3,600	
....	....	outdoor	"	"	5,500	
Smead	Smead	Smead	"	hydrant	2,000	
stove	windows	outdoor	fair	well	9,500	
"	"	"	bad	"	2,300	
furnace	"	indoor closets and privies.	good	"	4,850	
steam	"	closets	"	hydrant	½ square	
Bryce	Bryce	outdoor priv's	"	cist. & spring	1,480	
stove	windows	outdoor	"	well	4,800	
steam	"	"	bad	hydrant	600	No fire precaution
Smead	Smead	"	fair	"	400	Ventilat'n very bad.
Peck-W'mson	fan	closets	good	"	100	
stove	windows	outdoor	"	"	1,200	
steam	flues	"	"	well	8,500	
stoves	windows	"	"	"	1,440	
"	"	"	fair	"	11,900	
"	"	"	good	"	4,850	
furnace	"	closets	"	hydrant	1,200	
"	stack	"	"	"	none	
"	"	"	"	"	250	
"	"	"	"	"	180	
steam	"	"	"	"	130	
furnace	"	"	"	"	600	
steam	windows	"	"	"	125	
stoves	"	outdoor	"	well	4,440	
"	"	"	"	"	4,840	
"	"	"	"	"	4,000	
furnace	"	"	"	"	330	
Smead	Smead	Smead (?)	"	"	10,500	
"	"	outdoor	fair	"	3,000	
Peck-W'mson	register	Peck-W'mson	good	hydrant	3,600	Heating unsatisfactory.
stoves	shaft	outdoor	......	......	....	
Peck-W'mson	"	closets	good	hydrant	8,800	
Smead	Smead	outdoor	"	"	13,300	
stoves	windows	"	"	well	4,250	
Smead	Smead	Smead	"	"	9,680	
furnace	Kruse and Dewenter	outdoor	"	"	9,700	

Table I — School Houses — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Holmesville	....	brick	2	32	35	37	34	517	480	.19	.18
Hopedale	Church St.	wood	2	29	30	41	40	579	560	.12	.12
Hudson	Division St.	brick	5	38	48	21	15	251	182	.15	.10
Huntsville	Napoleon St.	wood	4	34	42	22	18	246	196	.19	.19
Huron	William St.	"	1	40	40	21	21	189	189	....	....
"	High school	brick	8	37	42	22	19	267	233	.08	.08
Hyde Park	....	....	....	....	....	....	....	.....	.....	....	....
Ithaca	....	....	....	....	....	....	....	.....	.....	....	....
Jackson	East b'ld'g	brick	8	45	45	17	17	250	250	....	....
"	Broadway	"	12	45	45	....	....	.....	.....	....	....
Jackson Center	Pike St.	"	2	44	46	23	22	295	282	.12	.11
"	Pike and High School	wood	2	21	30	42	34	517	406	.13	.13
Jeffersonville	Water St.	brick	6	28	36	30	30	465	393	.09	.09
Jenera	....	wood	1	42	42	27	27	404	404	.12	.12
Jerry City	Frankfother Ave.	"	4	40	59	22	18	270	216	.19	.19
Jersey	East Ave.	"	3	26	32	28	22	419	380	.22	.22
Jewett	W. Main St.	"	1	32	32	19	19	159	159	.08	.08
"	Main St.	brick	4	40	55	19	14	225	164	.17	.17
Junction City	Poplar St.	"	4	....	....	....	....	.....	.....	....	....
Kelley's Island	Estes High School	"	6	40	40	19	19	222	232	.18	.18
Kent	Depoyster St.	"	4	45	55	19	15	243	199	.20	.20
"	Central	"	9	45	84	30	16	475	328	.11	.09
"	South b'ld'g	"	6	38	42	21	19	270	243	.16	.15
Kenton	Central b'ld'g	"	8	40	40	20	20	243	243	.22	.22
"	North b'ld'g	"	3	31	35	34	30	482	422	.12	.12
"	South b'ld'g	"	4	44	50	18	16	252	249	.16	.16
"	West b'ld'g	"	4	96	96	9	9	119	119	.22	.21
"	East b'ld'g.	"	4	38	40	21	20	289	271	.22	.22
Kimbolton	....	wood	3	30	40	36	18	397	199	.11	.11
Kirby	....	"	1	35	35	37	37	512	512	.06	.06
Kossuth	Main St.	brick	2	....	....	....	....	.....	.....	.06	.06
Lakeside	Primary school	wood	1	30	30	31	31	312	312	.17	.17
Lakewood	South b'ld'g	brick	2	32	35	37	34	369	343	.12	.12
"	East b'ld'g	"	4	35	40	23	22	318	314	.15	.11
"	Central grade	"	4	43	56	21	15	286	268	.18	.18
"	East (annex)	wood	2	25	25	27	27	295	295	.19	.19
"	West b'ld'g	brick	3	22	23	35	33	284	267	.30	.30
"	High school	"	2	43	50	25	21	356	300	.25	.22
Lancaster	West b'ld'g	wood	4	34	39	21	20	253	236	.13	.10
"	Walnut St.	brick	12	37	48	26	18	379	248	.13	.10
"	North b'ld'g	"	14	37	46	24	17	309	205	.09	.06
"	East b'ld'g	"	8	39	47	27	22	355	269	.12	.12
La Rue	High and School Sts.	"	7	32	34	25	24	321	306	.15	.15
Latty	....	"	4	30	42	26	17	332	240	.26	.24
Laura	Main St.	"	3	35	42	27	23	408	340	.16	.16
Lebanon	....	"	12	45	54	19	15	261	214	.25	.20
Leetonia	Elm and High Sts.	"	9	40	60	29	18	380	232	.13	.10
"	South Side	"	4	35	47	24	18	295	221	.16	.14
Lewisville	Woodsfield St.	wood	2	22	30	33	25	366	275	.12	.12
Lexington	Frederick St.	brick	3	50	68	21	18	271	234	.24	.23
Lima	Lincoln	"	9	40	58	18	12	279	173	.15	.10
"	Kibby Colony	wood	1	36	36	17	17	170	170	.10	.10
"	Franklin	brick	12	42	52	23	19	337	259	.11	.11
"	Franklin (annex)	wood	4	45	50	19	16	236	212	.10	.10
"	Washington	brick	11	36	48	16	10	245	149	.21	.12
"	Washington (annex)	wood	2	44	54	16	13	160	160	.16	.16
"	Irving	brick	8	39	50	22	17	315	238	.20	.20
"	High School	"	9	63	306	19	11	185	108	.12	.07

Table I — School Houses — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
stoves	windows	outdoor	good	well	2,225	Doors open inward.
"	"	"	fair	"	1,500	Open well.
Smead	Smead	indoor	good	"	9,680	
stoves	windows	outdoor	fair	"	9,680	
"	"	"	good	"	500	
furnace	Smead	Smead	"	"	3,200	
....	....	....	....	....	....	
....	....	....	....	....	....	
furnace	windows	outdoor priv's	good	hydrant	7,540	
"	"	"	"	"	5,300	
stoves	"	"	fair	wells	2,000	
"	"	"	"	"	4,000	
furnace	Bennett and Peck	"	good	"	9,700	
stove	windows	"	"	"	1,720	
Smead	Smead	"	"	"	3,300	
furnace	windows	"	very bad	"	9,700	Poor furnace. Privies very bad.
stove	"	"	good	"	....	
"	"	"	fair	hydrant	5,000	
furnace	shafts	"	good	well	....	
Bartlett	gravity	"	"	cistern	5,000	
Smead	Smead	"	"	well	3,500	
Bennett and Peck	Bennett and Peck	"	"	well and hyd.	3,400	
steam	shafts	closets & privies	"	"	900	
furnace	fan	closets	"	hydrant	4,650	
Vogelgesang	Vogelgesang	outdoor priv's	bad	"	3,800	
"	"	"	"	"	3,300	
"	"	"	good	"	6,670	
furnace	windows	"	fair	"	2,900	
stove	"	"	bad	spring	3,600	No fire precautions.
"	"	"	good	well	4,800	
"	"	"	"	"	4,340	
"	"	"	"	cistern	unlimited	
furnace	"	closets	bad	hydrant	unlimited	Boys' closets unsanitary.
steam	ducts	outdoor priv's	good	"	4,600	
"	ducts & windows	"	"	"	4,800	
furnace	ducts & windows	"	"	"	4,600	
steam	ducts & windows	"	"	"	4,460	
"	ducts & windows	"	"	"	....	
stoves	windows	"	fair	well	1,380	
furn. & stoves	"	"	"	hydrant	19,200	Doors open inwards.
"	registers	closets	good	"	33,900	
stoves	windows	outdoor priv's	"	"	10,000	
Smead	Smead	Smead	"	well	8,820	
"	"	"	"	"	9,700	
stoves	windows	outdoor priv's	fair	"	....	
Smead	Smead	Smead	good	hyd. and well	9,000	
steam	windows	outdoor priv's	"	hydrant	1,840	
Peck-W'mson	gravity (?)	closets	"	"	950	
stoves	windows	outdoor priv's	bad	well	300	
Peck-W'mson	Peck-W'mson	"	good	"	24,000	
furnace	windows	"	fair	hydrant	700	
stoves	"	"	good	"	70	
"	"	"	"	"	2,000	
"	"	"	"	"	2,000	
Smead	Smead	Smead	"	"	550	
stoves	windows	"	"	"	550	
furnace	"	closets	"	"	2,300	
steam	"	"	"	"	none	No fire precautions.

Table I — School Houses — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Lima	Lowell	brick	5	48	56	13	11	186	150	.27	.25
“	Emerson	“	4	25	33	29	22	466	342	.22	.20
“	Shawnee	wood	2	43	45	19	18	230	222	.21	.21
“	Whittier	“	5	38	43	22	20	281	217	.16	.14
“	St. Rosa	brick	8	60	72	15	12	208	173	.20	.20
“	St. John	“	3	60	75	14	11	191	153	.12	.12
Lockland	West b'ld'g	“	2	37	39	17	16	201	194	.12	.11
“	West Fover St.	“	10	43	52	20	17	303	240	.19	.16
Lodi	Academy St.	“	5	32	50	28	25	380	300	.07	.06
Logan	High school	“	5	38	50	24	16	317	218	.05	.05
“	Primary	“	12	37	46	16	13	215	188	.25	.25
Loudonville	Wood St.	“	9	37	50	23	12	318	164	.12	.11
Louisville	Mill St.	“	5	44	53	20	20	315	202	.13	.10
Loveland	East	“	5	35	45	28	22	389	302	.37	.37
“	West	“	2	22	24	37	34	525	481	.16	.16
Lower Salem	Main St.	“	2	27	28	35	34	455	438	.30	.30
Madisonville		“	12	44	63	18	11	198	132	.16	.14
Magnolia	N. Main St.	“	4	41	48	20	17	284	241	.28	.28
Malinta	Henry St.	wood	2	40	40	24	24	294	294	.18	.18
Mansfield	Newman St.	brick	4	37	53	23	16	274	190	.17	.17
“	West 5th St.	“	8	39	49	25	18	328	301	.15	.13
“	St. Peters	“	4	48	70	17	11	223	144	.12	.10
“	Prospect St.	“	4	34	43	24	19	308	242	....	....
“	West 1st St.	“	8	45	60	36	26	495	373	....	....
“	East 4th St.	“	10	45	60	19	15	290	225	....	....
“	High School	“	12	40	40	21	21	349	349	.23	.23
“	Marion Ave.	“	8	44	70	22	12	327	179	.11	.11
“	Hedges St.	“	11	41	53	23	18	335	255	.14	.14
“	Bowman St.	“	10	48	50	21	20	297	286	.11	.11
Marblehead	Main St.	stone	4	37	40	47	42	662	604	.07	.06
Marion	Forest Lawn	brick	6	39	48	20	17	286	233	.17	.17
“	Greenwood St.	“	8	40	50	22	17	305	241	.27	.27
“	Davids St.	“	3	38	45	20	17	283	241	.18	.18
“	Silver St.	“	7	36	44	25	20	345	286	.21	.21
“	Lincoln	“	6	41	47	16	14	230	198	.46	.38
“	High School	“	6	49	70	35	16	608	263	.18	.10
“	St. Mary's	“	7	41	70	14	12	176	139	.10	.04
“	Central b'ld'g	“	13	42	70	21	13	311	129	.14	.09
“	North State St.	“	8	38	53	23	16	370	254	.15	.14
Martins Ferry	Fourth St.	“	10	42	50	30	17	453	250	.16	.19
“	South Ward	“	19	39	48	20	15	260	195	.24	.17
Maumee	Conant and Broadway	“	5	35	50	27	19	314	230	.14	.14
McArthur	High St.	“	6	27	41	30	15	362	175	.19	.14
McComb		“	8	36	52	19	13	277	184	.22	.22
McConnelsville		“	8	44	61	17	8	239	100	.16	.13
Mechanicsburg	E. High St.	“	10	35	37	25	21	307	254	.18	.17
Medina	High School	“	6	56	105	19	15	280	240	.19	.15
“	Primary	“	4	45	45	14	14	172	172	.30	.30
Melrose	Franklin St.	wood	3	90	90	27	27	480	480	.16	.16
Metamora		“	2	37	40	33	31	457	428	.19	.19
Miamisburg	Fourth and Main Sts.	brick	4	44	47	17	16	194	184	.18	.18
“	“ “ No. 1.	“	6	36	46	20	14	223	144	.15	.12
“	“ “	wood	2	36	38	17	16	224	216	.14	.14
“	“ “	“	2	30	30	22	21	214	210	.13	.13
“	“ “ No. 2.	“	2	35	36	15	15	150	148	.17	.17
“	Mercher St.	brick	2	28	30	28	27	396	376	.21	.21
Middleport	Central	“	10	44	56	17	10	262	152	.15	.12
“	Colored	“	3	22	25	35	31	425	369	.17	.17

TABLE I — SCHOOL HOUSES — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply	Area of play-ground in square yard.	Remarks.
furnace	windows	closets	good	hydrant	2,000	
Smead	Smead	Smead	“	cistern	2,020	
stoves	windows	outdoor clos's	“	“	2,020	
“	“	“	bad	“	180	
steam	“	“	good	hydrant	1,200	
“	“	indoor closets	“	“	280	
stoves	“	outdoor priv's	fair	“	340	
furnace	“	“	good	“	2,500	
Smead	Smead	Smead	“	“	18,000	
stoves	windows	outdoor priv's	“	“	2,400	Doors open inwards.
Smead	Smead	Smead	“	“	2,400	Poor ventilation.
steam	shafts	outdoor clos's	fair	well	7,200	
hot air	fan	outdoor priv's	good	hydrant	3,600	
furnace	shafts	“	“	cistern	2,400	
“	“	“	“	“	45	
stoves	windows	“	fair	well	3,000	
furnace	gravity	“	good	wells	10,000	
“		“	“	well	3,200	
stoves	windows	“	“	“	4,840	
Caldwell	stacks	dry closets	“	hydrant	9,700	
hot air	fan	closets	good	“	30,000	
Smead	Smead	Smead	“	“	1,250	
steam		dry closets	“	“	10,550	
hot air	Fuller-Warren Co.	indoor	“	“	28,000	
“	gravity	“	“	“	9,700	
Smead	Smead	Smead	“	“	none	
steam	ducts		“	“	700	
hot air	fan	dry closets	“	“	30,000	
steam	flues	“	“		10,000	
Kruse and Dewenter	Kruse and Dewenter	“	“	cistern	unlimited	
furnace		Smead	“	hydrant	11,680	
Smead		“	“	“	5,530	
furnace		outdoor priv's	“	well	4,200	
Smead		closets	“	“	13,700	
“		Smead	“	hydrant	4,900	
“		“	“	“	6,100	
steam	windows	outdoor priv's	“	well	2,820	
Smead		Smead	“	hydrant	10,870	
“		“	“	“	13,130	
“	Smead	“	“	“		
“	“	“	“	“	3,600	
“	shafts	outdoor priv's	fair	well	3,800	
stoves	windows	“	good	“	18,720	
“	shafts	“	“	“	18,000	
steam	windows	“	fair	hydrant	4,800	
hot air	Peck-W'mson	dry closets	good	well	9,900	
Smead	Smead	outdoor priv's	fair	hydrant	6,400	
“	“	Smead	good	cistern	8,960	
“	“	outdoor priv's		“	7,500	Think information is incorrect.
furnace	windows	“	bad	well	3,150	Well liable to pol
Smead		dry closets	good	“	3,600	
furnace	windows	dry closets and privies.	fair	“	3,600	
stoves	“	dry closets and privies.	“	“	3,600	
“	“	dry closets and privies.	“	“	3,600	
“	“	dry closets and privies.	“	“	3,600	
furnace	“	outdoor priv's	good	“	1,200	
stoves	“	“	“	well & cistern	7,000	Doors open inwards.
“	“	“	“	“	1,000	

TABLE I — SCHOOL HOUSES — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Middleport	Fifth Ward	brick	1	20	20	36	36	396	396	.16	.16
Middletown	Central b'ld'g	“	12	41	50	21	18	309	265	.17	.15
“	North b'ld'g	“	10	31	38	23	20	295	256	.20	.19
“	South b'ld'g	“	8	36	43	25	20	388	321	.21	.21
“	East b'ld'g	wood	4	33	50	26	17	314	207	.15	.12
Milford Center		brick	6	33	35	19	16	272	259	.17	.17
Mineral City		“	8	39	50	25	19	346	267	.16	.19
Mineral Ridge	Main St. No. 1	“	4	34	46	36	27	460	370	.08	.08
“	Main St. No. 2	wood	2	19	20	53	50	636	605	.07	.07
Minerva		brick	6	47	55	29	21	480	380	.09	.08
Mingo Junction	Logan school	“	4	42	65	23	15	323	212	.20	.20
“	Franklin	wood	6	45	60	15	12	179	150	.14	.11
Monroeville	Broad St.	brick	6	28	35	49	40	791	640	.17	.17
Morristown	Church St.	“	3	32	35	32	25	474	375	.20	.18
Morrow	MacClave St.	“	6	38	55	22	15	277	185	.18	.17
Moscow	Fourth and Wells Ave.	“	4	30	35	43	19	229	206	.08	.08
Mt. Pleasant	Colored	wood	1	30	30	22	22	260	269	.14	.14
“	High School	brick	4	38	44	22	17	272	203	.16	.10
Mt. Sterling	Public School	“	6	33	45	27	20	382	279	.16	.16
“	High School	“	3	35	50	44	30	612	416	.13	.11
Mt. Healthy		“	7	35	45	22	16	264	149	.16	.12
Mt. Cory		wood	1	40	40	33	33			.08	08
“	Main Cross St.	brick	2	39	50	32	24			.10	.10
Mt. Vernon	Central b'ld'g	“	7	41	45	16	15	196	179	.20	.16
“	High School	“	10	33	40	23	19	275	230	.21	.13
“	Davis b'ld'g	“	4	43	45	21	20	269	259	.18	.18
“	3rd Ward	“	4	45	48	19	18	270	245	.25	.23
“	4th “	“	4	41	42	17	17	206	201	.23	.23
“	1st “	“	2	47	50	18	17	212	202	.23	.21
“	2nd “	“	2	42	45	19	18	229	217	.23	.22
Mt. Washington		“	3	33	45	30	28	456	362	.19	.19
Murray City	Locust St.	wood	6	51	65	15	12	153	119	.06	.06
Napoleon	Catholic schools	“	2	35	40	17	15	204	178	.14	.14
“	Main St.	brick	11	47	85	19	14	284	184	.11	.07
“	South Side Ward	“	2	31	40	22	17	260	201	.17	.17
Navarre	Main St.	“	5	48	58	22	15	288	181	.10	.09
Nelsonville	1st Ward	“	5	48	60	19	15	227	182	.15	.14
“	Central b'ld'g	“	12	42	65	19	19	262	168	.20	.19
“		“	8	47	53	16	14	199	177	.13	.12
Newark	East Main St.	“	8	32	27	26	22	361	305	16	.14
“	East Main St. (overflow)	“	1	33	33	17	17	227	227	.16	.16
“	Mill St.	“	6	43	49	20	18	257	229	.16	.10
“	Texas b'ld'g	wood	2	22	25	36	32	711	640	.16	.16
“	South 3rd St.	brick	4	35	48	25	18	305	224	.13	.13
“	Franklin	wood	1	28	28	29	29	457	457	.16	.16
“	North 3rd St.	brick	4	46	55	17	15	241	204	.23	.23
“	North 4th St.	“	8	37	50	22	16	303	225	.16	.16
“	North 4th St. (overflow)	wood	1	40	40	25	25	255	255	.20	.26
“	Central b'ld'g	brick	12	44	59	19	15	222	169	.11	.10
“	Wood Side	“	4	31	36	22	16	195	140	.11	.09
“	Fifth St.	“	7	29	34	24	17	296	205	.13	.13
“	High School	“	6	44	58	24	18	440	330	.15	.15
“	West End	“	6	38	50	20	16	267	208	.17	.15
“	West End No. 2	“	3	34	40	23	15	276	182	.14	.13
“	St. Frances de Sales	“	8	49	66	17	12	198	148	.12	.12
New Bremen	Franklin St.	“	8	36	52	25	19	370	266	.20	.20
New Carlisle	Madison Ave.	“	7	36	45	30	20	405	277	.15	.13
Newcomerstown	State St.	“	8	37	52	22	16	306	216	.17	.16
“	College St.	“	8	34	50	24	16	329	224	.17	.16
New Concord		“	4	30	36	26	21	358	299	.15	.15

TABLE I — SCHOOL HOUSES — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
stoves	windows	outdoor priv's	good	well & cistern	1,980	
furnace	Bennett and Peck	closets	"	hydrant	8,900	
Fuller and Warren	Fuller & Warren	"	"	"	2,100	
stoves	windows	"	"	"	19,300	
"	"	outdoor priv's	"	hyd. and well	12,200	
furnace	registers	"	"	hydrant	4,800	
"	fan	"	fair	"	2,500	
stoves	windows	"	good	cistern & well	7,200	
"	"	"	"	well	2,400	
hot air	flues	"	"	hydrant	6,540	
stoves	windows	"	fair	"	500	
"	"	"	"	"	200	Outdoor closets only 10. ft. from b'ld'g.
steam	....	"	good	wells	3,200	
stoves	windows	"	bad	"	4,500	
"	ventil't'g stov	"	good	"	10,000	
"	windows	"	fair	"	430	
"	"	"	good	"	900	
"	flues	"	"	"	4,000	
furnace	windows	"	fair	hydrant	7,200	
"	"	"	"	"	3,600	
stoves & furn.	"	"	good	cistern	6,500	
stoves	"	"	....	....	....	
"	"	"	....	....	....	
steam	"	closets	good	hydrant	400	
"	....	"	"	"	400	
furnace	shafts	"	"	"	2,500	
"	Smead	"	"	"	500	
Smead	"	"	"	"	500	
stoves	windows	outdoor priv's	"	"	2,800	
"	"	"	"	"	400	
"	"	"	"	cistern	10,000	Pupils of one room face windows.
"	"	"	fair	well	2,630	
"	"	"	good	cistern & hyd.	3,025	
steam	"	"	"	cistern	10,000	
stoves	Smead	"	"	well	3,000	Doors open inwards.
hot air	windows	outdoor priv's	good	"	12,500	
furnace	Vogelgesang.	"	"	hydrant	1,250	
stoves	flues	"	"	"	1,870	
steam	shafts	"	"	"	2,700	
Peck-W'mson	Peck-W'mson	"	"	"	960	
stoves	windows	"	"	"	960	
furnace	"	"	"	"	950	
stoves	"	"	fair	"	660	
"	"	"	good	"	720	
"	"	"	"	"	1,440	
furnace	"	closets	"	"	1,300	
steam	"	"	"	"	1,440	
stoves	"	"	"	"	1,440	
furnace	"	outdoor priv's	"	"	2,770	
stoves	"	"	"	"	5,300	
"	"	"	"	"	1,200	
steam	Emmick and Hatcher	"	"	"	250	
Smead	Smead	closets	"	"	2,800	
stoves	windows	outdoor priv's	"	wells	1,000	
"	"	closets	"	"	1,900	
Akron	Akron	outdoor priv's	fair	well	11,000	
hot air	windows	"	good	"	29,000	
"	"	"	"	"	9,680	Some doors open inwards.
"	"	"	"	"	8,100	
furnace	flues	"	"	"	5,200	

TABLE I — SCHOOL HOUSES — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
New Knoxville		brick	3	44	49	21	18	269	242	.09	.08
New Lexington	Jackson and Water	“	11	46	70	28	27	449	432	.07	.05
New London	Main St.	“	6	40	40	25	25	375	375	.11	.11
New Philadelphia	Central b'ld'g	“	15	46	100	21	14	291	202	.19	.14
“	West End b'ld'g	“	8	36	42	25	19	348	262	.16	.12
“	South Side b'ld'g	“	3	35	38	26	24	362	330	.11	.11
“	East End b'ld'g	“	4	31	33	23	22	325	306	.20	.20
New Richmond	Market St.	“	8	41	53	19	15	275	213	.12	.12
“	Walnut St.	wood	1	59	59	22	22	264	264	.16	.16
“	Catholic	“	1	42	42	20	20	202	202	.10	.10
New Riegel	Perry St	“	1	20	20	60	60	600	600	.07	.07
“	Findle St.	brick	4	30	30	40	40	400	400	.05	.05
New Straitsville	Ball St.	“	10	52	100	14	16	179	83	.15	.13
New Washington	Kibler St.	“	4	38	46	23	18	327	242	.15	.14
“	Parochial	“	2	37	39	18	18	226	222	.22	.21
New Waterford	State St.	“	3	37	50	22	16	273	200	.17	.15
North Baltimore		wood	4	41	43	20	19	237	225	.13	.12
“	North b'ld'g	brick	6	43	48	20	18	272	245	.15	.14
“	Central b'ld'g	“	5	37	47	22	17	303	243	.19	.17
North Lewisburg	Maple St.	“	4	43	55	21	16	288	207	.18	.16
North Robinson		“	2	31	33	27	26	396	378	.15	.15
Norwood	Allison St.	“	8	30	30	24	24	300	300	.18	.18
Oak Harbor	Church St.	“	8	46	68	24	19	352	290	.14	.04
Oak Hill	Main St.	“	4	....	....	....	....	......	......	....	....
Oberlin	Central	“	9	53	153	21	15	269	189	.10	.08
“	Pleasant St.	“	4	37	40	21	18	258	224	.24	.22
“	Prospect St.	“	4	32	37	24	21	296	270	.24	.22
Olmsted Falls	Water St.	“	3	29	33	29	19	405	229	.15	.13
Ottawa	High School	“	8	29	50	31	22	434	312	.15	.09
“	Walnut and Third Sts.	“	5	30	35	20	16	243	163	.16	.16
Otway		wood	3	31	40	25	22	297	261	.16	.14
Orrville	North Walnut St.	brick	8	37	67	25	16	307	215	.10	.09
Osgood	West Main St.	“	2	45	50	19	14	252	180	.03?	.02?
Osnaburg		tile	4	39	45	....	....	......	......	....	....
Ostrander		brick	4	22	25	36	32	435	392	.015	.015
Oxford	Spring and College	“	8	45	45	19	19	286	286	.11	.11
Painesville	Parochial	wood	4	31	35	29	26	288	257	.12	.12
“	Washington St.	brick	7	35	40	27	25	372	350	.13	.11
“	Jackson St.	“	6	38	38	22	22	260	260	.16	.16
“	High School	“	8	35	35	23	23	322	322	.30	.29
“	St. Clair St.	“	4	35	35	20	20	227	227	.15	.15
“	State St.	“	4	30	30	24	24	315	315	.18	.18
“	Lake Erie Female College	“	....	....	....	....	....	......	......	....	....
Pataskala	Main St.	“	6	28	36	31	27	316	273	.11	.10
Patterson		“	8	33	33	20	15	247	175	.12	.09
Paulding	Water St.	“	10	42	85	19	15	286	206	.16	.14
Pemberville	Pine and College	“	6	46	59	20	14	281	191	.19	.16
“	Cedar St.	wood	1	40	40	15	15	205	205	.10	.10
Piketon		brick	5	27	45	26	15	269	149	.16	.12
Pioneer	State and Church	“	4	37	52	26	18	371	277	.17	.17
Plain City	West Main St.	“	8	38	48	26	19	341	225	.20	.15
Pleasant City	Orchard St.	wood	6	46	55	20	15	238	180	.14	.12
Pleasant Hill	High School	brick	5	27	30	25	22	363	315	.16	.16
Pleasant Ridge	Main Ave.	“	6	37	51	19	15	236	183	.18	.17
Pleasantville	Fairfield Academy	“	2	22	25	35	35	455	455	.21	.21
“	Mill St.	“	6	....	....	....	....	......	......	.08	.08
Portsmouth	Vinton Ave.	wood	1	50	50	16	16	192	192	.22	.22
“	High St.	“	2	32	32	28	28	306	306	.12	.12
“	Second St.	brick	8	37	50	28	12	322	118	.04	.04
“	Earlytown	wood	2	34	35	24	22	250	153	.08	.02?
“	Eleventh St.	brick	5	25	33	37	27	476	355	.22	.17
“	Sixth St.	“	5	37	40	29	21	371	273	.12	.08

TABLE I — SCHOOL HOUSES — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
stove	windows	outdoor priv's	good	well	3,720	
Smead	Smead	"	"	"	20,000	
hot air	"	"	"	"	....	
steam	flues and windows	"	fair	hydrant	8,000	
Smead	Smead	Smead	good	"	15,000	
"	"	"	"	well	7,500	
"	"	"	"	hydrant	1,800	
stoves	windows	outdoor priv's	"	cisterns	1,200	
"	"	"	"	"	1,000	
"	"	"	"	"	1,600	
"	"	"	fair	well	1,200	
"	"	"	"	"	9,700	
"	"	"	"	cist'n & wells	400	
steam	"	"	"	well	11,300	
furnace	flues	"	"	"	3,220	
Peck-W'mson	Peck-W'mson	Peck-W'mson	good	"	1,100	Some doors open inwards.
stoves	windows	closets	"	"	7,250	
steam	flues	"	fair	"	2,900	Overflow of sewage under basement floor.
"	windows	"	good	"	7,250	
Smead	Smead	outdoor priv's	"	"	2,000	
stoves	windows	"	"	"	5,000	
furnace	shafts	closets	"	hydrant	10,000	
Smead - Ruttan	Smead - Ruttan	Smead	"	well	4,840	
stoves	windows	outdoor priv's	bad	wells	4,000	New building under way.
steam	shafts	closets	good	hydrant	9,400	
Smead	Smead	Smead	"	"	5,000	
"	"	"	"	"	15,700	
stoves	registers	outdoor priv's	"	well & cistern	121	Also public square.
hot air	....	dry closets	"	well	8,000	
stoves	windows	outdoor priv's	"	"	3,000	
"	"	"	fair	wells	900	
Smead	Smead	"	good	hydrant	1,440	
stoves	windows	"	very bad	well	4,840	
hot air	"	"	good	"	....	
stoves	"	"	"	"	9,700	
furnace	....	Clark system.	"	hydrant	20,000	
stoves	windows	outdoor priv's	"	"	1,700	Some pupils face windows.
steam	gravity	closets	bad	"	12,000	Bad odors in rooms.
"	"	"	good	"	2,700	
"	"	"	"	"	11,000	
hot air	"	outdoor clos's	"	"	2,700	
hot water	"	closets	"	"	3,200	
steam	"	"	"	"	48,000	
furnace	windows	outdoor priv's	fair	well	1,300	
stoves	"	"	good	"	1,200	Cattle wattered at the well.
Smead	Smead	"	"	"	....	
"	"	Smead	"	"	4,840	
stove	windows	outdoor priv's	"	"	1,400	
stoves	"	"	fair	"	3,150	
steam	shafts	"	good	"	3,200	
Smead	Smead	Smead	"	hydrant	14,400	
stoves	windows	outdoor priv's	bad	wells	200	
hot air	"	"	fair	"	9,700	Doors open inwards.
furnace	shafts	"	good	cistern	7,000	
stoves	windows	"	"	well	19,000	
furnace	"	"	"	"	7,200	
stoves	"	"	"	cistern	420	
"	"	"	"	"	1,230	
"	"	"	"	cistern & hyd.	1,860	
"	"	"	"	"	1,400	
"	"	"	"	hydrant	1,400	
"	"	"	"	cistern	2,000	

TABLE I — SCHOOL HOUSES — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Portsmouth	Campbell Ave.	brick	8	37	53	24	17	338	238	.27	.27
"	Offnere St.	"	8	44	61	17	12	249	184	.26	.21
"	Fourth St.	"	10	32	42	20	15	296	225	.23	.22
"	Union St.	"	12	39	58	19	13	281	187	.41	.41
"	High School	"	*5	36	180	12	12	174	174	.21	.21
Port Washington	....	wood	4	....	....	....	....	....	....	.08	.08
Prospect	North St.	brick	6	41	53	18	13	269	184	.18	.15
Put-in-Bay	Central	wood	3	33	40	30	22	412	284	.12	.08
"	East Point	"	1	12	12	55	55	770	770	.14	.14
Quaker City	....	brick	6	38	45	25	16	346	226	.19	.18
Ravenna	West Main St.	"	2	45	50	21	19	296	266	.17	.17
"	Chestnut St.	"	9	43	50	21	17	275	218	.06	.04
"	High School	"	3	62	96	24	21	403	383	.13	.10
"	Catholic	"	2	40	50	18	17	219	211	.10	.08
Rawson	....	"	4	34	54	32	20	381	240	.15	.13
Reading	....	"	8	40	40	22	22	313	313	.19	.18
"	Wine St., main b'ld'g.	"	4	62	76	12	10	144	118	.19	.15
"	Wine St., small	wood	1	72	72	11	11	122	122	.14	.14
Republic	High School b'ld'g.	brick	4	24	27	27	23	339	278	.16	.14
Richmond	River St.	"	3	39	45	19	12	208	121	.16	.15
Richwood	Ottawa St.	"	7	38	55	20	14	276	190	.22	.21
"	Ottawa St.	"	2	40	40	21	21	298	298	.20	.20
Ridgeway	Hale and Hardin	"	3	28	36	27	21	401	294	.30	.29
Ripley	Union School	"	10	35	....	....	....	....	....	....	....
Rising Sun	High School	"	4	46	60	....	....	....	....	....	....
Rockford	....	"	7	40	56	....	....	....	....	....	....
Rockport	High School	"	4	30	32	28	26	325	302	.14	.14
"	Truscott Road	wood	2	34	43	21	16	216	171	.17	.17
"	Lindale Road	brick	2	23	25	40	37	451	402	.15	.15
"	Southern part	"	1	17	17	54	54	642	642	.14	.14
Rushylvania	....	"	4	39	42	21	19	271	251	.12	.12
Rushville	....	"	3	23	24	28	21	339	255	.24	.20
St. Clairsville	Main St.	"	6	53	65	17	13	245	185	.19	.19
St. Marys	East Side	"	11	37	40	24	24	360	360	.22	.16
"	West Side	"	10	39	50	23	20	350	300	.22	.22
"	2nd Ward	wood	2	37	40	24	22	312	292	.16	.16
"	4th "	"	2	38	40	23	22	351	337	.22	.22
St. Paris	High St.	brick	7	32	42	25	19	354	275	.13	.11
Salem	High School	"	12	....	....	....	....	....	....	....	....
"	Columbus St.	"	8	....	....	....	....	....	....	....	....
"	East Main St.	"	8	....	....	....	....	....	....	....	....
"	Prospect St.	"	6	....	....	....	....	....	....	....	....
Salesville	Washington Ave.	wood	3	25	45	41	24	496	279	.09	.09
Salineville	Main St.	brick	8	44	65	15	10	227	152	.17	.17
"	Church St.	"	3	44	50	17	15	209	182	.22	.22
"	Hayti St.	wood	1	28	28	26	26	309	309	.22	.22
"	West End	"	1	39	39	22	22	257	257	.19	.19
Sandusky	Central School	stone	9	59	224	21	14	299	194	.13	.09
"	10th Ward	"	11	43	56	19	15	250	149	.19	.11
"	9th "	"	8	40	47	22	19	286	242	.18	.17
"	8th "	"	12	35	43	23	18	295	230	.17	.10
"	7th "	"	8	42	47	18	16	253	226	.20	.20
"	6th "	"	6	44	50	17	14	240	196	.19	.18
"	4th "	brick	7	42	48	23	20	308	260	.15	.15
Scio	North Main St.	brick	7	38	48	18	14	236	186	.09	.08
Scott	....	"	4	48	58	16	14	214	181	.18	.16
Shawnee	Walnut St.	"	6	38	50	22	16	262	198	.11	.10
"	Chestnut St.	wood	5	74	90	14	11	168	138	.08	.07
Shreve	....	brick	6	35	45	33	19	442	230	.11	.09
Sidney	Holy Angels	"	5	46	55	20	17	240	207	.14	.12
"	3rd Ward	"	8	40	55	20	15	268	195	.26	.23
"	1st "	"	2	36	38	24	23	316	297	.14	.14
"	Central	"	12	42	56	22	20	339	315	.19	.12
"	2nd Ward	"	4	41	48	20	16	245	194	.25	.24

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* 1 assembly room, 4 recitation rooms.

TABLE I — SCHOOL HOUSES — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
furnace	windows	outdoor priv's	good	cistern	4,600	
“	“	“	“	hyd. & cistern	2,530	
“	“	“	“	“	1,130	
“	“	“	“	“	5,540	
“	“	“	“	cistern	....	
stoves	“	“	“	well	7,260	
Peck-W'mson	“	“	“	“	12,200	Some doors open inwards.
stoves	“	“	fair	“	3,600	
“	“	“	“	“	1,000	
“	“	“	“	“	4,300	
furnace	“	“	good	hydrant	1,000	
“	....	“	“	“	3,020	
“	....	“	“	“	2,700	
stoves	windows	“	“	“	300	
“	“	“	fair	well	1,670	
Smead	Smead	Smead	“	well and hyd.	40,000	
stoves	windows	outdoor priv's	“	well	880	No fire precautions.
“	“	“	“	“	880	
furnace	“	“	“	cistern	7,200	Poor ventilation.
“	“	“	“	hydrant	2,100	
“	“	“	good	well	9,700	
“	“	“	“	“	9,700	
stoves	“	“	“	“	6,100	
“	“	“	fair	hydrant	....	
Smead	Smead	Smead	good	well	9,700	
furnace	....	outdoor priv's	fair	hydrant	9,700	
“	shafts	“	good	well	2,500	
stoves	windows	“	“	“	1,500	
“	“	“	fair	“	2,000	
“	“	“	“	“	2,500	
“	“	“	good	cistern	6,000	
“	“	“	fair	well	9,700	
steam	“	“	“	“	3,120	
Smead	Smead	closets	good	hydrant	4,000	
“	“	“	“	“	3,100	
stoves	shafts	outdoor priv's	“	“	2,000	
“	windows	“	“	“	2,000	
furnace	flues	“	fair	well	11,140	Some liability of well being polluted.
Smead	Smead	Smead	good	hydrant	....	
“	“	“	“	“	....	
“	“	“	“	“	....	
“	“	“	“	“	....	
stoves	windows	outdoor priv's	bad	wells	900	
furnace	“	dry closets	good	hydrant	3,600	
stoves	“	outdoor priv's	“	“	2,400	
“	“	“	“	spring	30	
“	“	“	“	well	2,400	
hot air	windows	closets & privies	“	hydrant	5,500	
steam	grates	privies	“	“	4,700	
hot air	Cin'nati Heat. & Vent. Co	closets	“	“	2,600	
steam	grates	privies	“	“	11,300	
hot air	“	“	“	“	470	
“	windows	“	“	“	2,100	
“	“	“	“	“	2,500	
steam	“	outdoor priv's	very bad	well	7,500	
stoves	“	“	good	“	4,840	
“	“	“	“	“	400	
“	“	“	“	“	1,000	
steam	“	“	“	hydrant	6,400	
stoves	shafts	“	fair	“	615	
Smead	Smead	Smead	good	“	....	
“	“	outdoor priv's	“	hyd. and well	1,500	
“	“	Smead	“	hydrant	3,025	
“	“	“	“	“	3,500	

TABLE I — SCHOOL HOUSES — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Sidney	4th Ward	brick	3	36	38	20	19	240	228	.18	.18
Smithfield	High St.	“	4	26	32	28	23	368	305	.09	.08
Smithville	Summit and Main	“	4	28	40	18	16	234	195	.20	.19
Somerset	Main and High	“	6	26	37	21	34	437	336	.10	.10
“	Holy Trinity	“	4	39	54	13	10	145	103	.21	.16
South Bloomfield	....	“	3	24	30	36	21	491	256	.07	.06
South Brooklyn	Pearl St.	“	8	46	63	19	14	233	171	.14	.10
“	St. Marcus	wood	1	60	60	14	14	144	144	.09	.09
“	Catholic	“	2	54	59	13	12	157	147	.09	.09
“	Moulton Ave. No. 1	brick	4	25	25	38	38	489	489	.09	.09
“	“ “ No. 2	“	4	25	25	38	38	500	500	.19	.19
South Lebanon	....	“	3	31	36	30	23	395	293	.10	.10
Sparta	....	wood	3	24	25	34	33	406	391	.09	.08
Spencerville	....	brick	11	38	48	25	19	347	269	.06	.05
Springboro	Market and East Sts.	“	4	30	35	30	24	296	237	.01?	.01?
Springfield	High and Factory	“	9	43	55	19	15	256	158	.16	.14
“	High School	“	16	34	43	25	19	390	304	.18	.14
“	Limestone and Miller	“	8	42	48	18	16	241	209	.14	.14
“	Clifton	“	14	45	50	18	15	270	219	.19	.14
“	Lincoln	“	8	40	50	31	25	472	377	.15	.14
“	McKinley	“	9	....	....	....	....	......	......	.16	.11
“	North St.	wood	3	38	40	17	17	210	209	.15	.04
“	Garfield	brick	8	39	47	17	13	242	180	.13	.11
“	Western	“	10	43	48	15	12	220	152	.17	.09
“	Fair St.	“	3	23	25	33	31	468	437	.13	.13
“	Oakland	“	3	28	32	21	14	287	200	.12	.10
“	Washington	brick	9	34	45	23	17	277	207	.11	.11
“	Lagonda	“	6	31	38	25	20	313	237	.15	.12
“	Grey Hill	“	9	40	50	19	15	237	191	.20	.16
“	Shaffer St.	“	8	41	50	22	18	333	266	.12	.12
“	Northern College	“	18	41	49	20	15	305	220	.21	.17
“	Dibert St.	“	8	40	47	20	17	318	273	.21	.21
Spring Valley	....	“	4	32	45	17	11	191	121	.10	.08
Startle	Long Run	wood	2	25	26	42	40	420	404	.09	.09
Steubenville	Stanton School	brick	12	53	96	24	22	456	415	.11	.10
“	Washington	“	8	40	42	24	23	360	343	.15	.15
“	Garfield	“	7	38	44	25	22	374	325	.15	.15
“	Jefferson	“	3	28	37	23	17	315	236	.26	.26
“	Lincoln	“	4	39	47	21	18	321	268	.23	.23
“	St. Peters	“	5	52	78	24	16	310	208	.11	.11
“	Grant	“	10	48	80	22	18	331	249	.11	.09
Strasburg	....	“	4	32	42	26	19	354	268	.16	.14
Stryker	....	“	7	41	50	22	18	332	270	.12	.11
Sugar Grove	East St.	“	3	23	36	35	23	420	272	.12	.12
Summerfield	Church St.	“	3	50	55	16	15	192	175	.12	.12
Swanton	“	“	5	48	60	18	12	216	148	.12	.11
Sycamore	North Sycamore St.	“	4	51	71	19	15	248	198	.12	.11
Sylvania	Division St.	“	5	31	35	26	24	344	176	.11	.04
Thornville	East Columbus St.	“	4	24	35	40	27	534	384	.07	.06
Tiffin	Columbian	stone	9	39	110	22	17	301	291	.14	.12
“	Union b'ld'g	brick	10	49	50	28	17	459	238	.07	.05
“	College Hill	“	4	35	49	22	16	314	219	.08	.08
“	Minerva	“	6	36	40	19	17	245	201	.15	.09
“	St. Marys	“	3	34	48	36	26	545	390	.07	.07
“	St. Joseph's	“	8	49	60	18	13	246	187	.22	.22
“	Jackson and Miami Sts.	“	8	36	50	26	19	397	288	.17	.17
Tippecanoe City	5th and Dow St.	“	9	40	67	22	13	280	175	.19	.14
Tiro	....	wood	3	24	25	30	17	362	185	.10	.08
Toledo	Central High	brick	62	....	....	....	....	......	......	....	....

TABLE I — SCHOOL HOUSES — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
Peck-W'mson	Peck-W'mson	dry closets	good	hydrant	3,500	
stoves	windows	outdoor priv's	"	well	3,600	
hot water	flues	"	bad	"	9,700	
stoves	windows	"	fair	"	300	
"	"	"	good	"	250	
"	"	"	fair	"	2,800	
furnace		"	good	hydrant	40	
stoves		"	"	well	12	
furnace		"	"	"	2,400	
steam	windows	"	"		2,500	
"	"	"	"	well	100	
stoves	"	"	"	"	5,000	Doors open inwards.
furnace	"	"	"	"	12,000	
hot water	"	"	"	"	8,000	
stoves	"	"	fair	"		
steam	air shafts	closets	good	hydrant	2,000	
"	shafts & windows	"	"	"	2,000	
furnace	windows	outdoor priv's	fair	"	3,200	
steam	shafts	"	bad	"	3,150	
"	windows	"	"	"	2,600	
Smead	Smead	Smead	fair	"	3,100	
stoves	windows	outdoor priv's	"	"	630	Building unsanitary.
steam	registers and windows	"	"	"	3,300	
"	registers and windows	"	"	"	3,700	Poor ventilation.
stoves	windows	"	"	"	1,400	
"	"	"	bad	"	1,950	Bad condition.
steam	"	closets	good	"	9,400	
Smead	Smead	Smead	"	"	3,140	
"	"	"	"	"	10,200	New closet - system needed.
steam	registers	outdoor priv's	fair	"	8,050	
"	registers and windows	outdoor priv's and closets.	"	"	9,800	
Smead	Smead	Smead	"	"	2,500	
hot air		outdoor priv's	good	spring	8,200	
stoves	windows	"	"	well	4,200	
steam	registers	"	"	hydrant	33,600	
Smead	Smead	"	"	"	4,500	
"	"	"	"	"	2,000	
Peck-W'mson	Peck-W'mson	closets	"	"	1,500	
Smead	Smead	Smead	"	"	4,800	
furnace	windows	outdoor priv's	fair	"	250	
steam	"	"	good	"	1,700	
stoves	"	"	"	well	6,000	
steam	flues & windows	indoor privies	"	"	7,500	
stoves	windows	outdoor priv's	fair	"	5,600	
"	"	"	"	"	3,600	
"		"	good	"	2,400	
furnace	registers	"	"	"	4,800	
steam	windows	"	"	"	4,800	
stoves	"	"	fair	"	7,000	
Bennett-Peck	Bennett and Peck	closets	good	hydrant	90	
furnace	windows	"	"	hyd. & cistern	30,000	Some doors open inwards.
stoves		outdoor priv's	"	"	1,800	
furnace	flues	closets	"	hydrant	2,400	Doors open inwards.
stoves	windows	"	bad	well	3,600	
furnace	flues	"	good	hydrant	2,000	Doors open inwards.
"	"	"	"	"	4,500	" "
"	"	"	"	"	24,000	
stoves	windows	outdoor priv's	"	well	9,700	
Smead	Smead	closets	"	hydrant	10,000	

TABLE I — SCHOOL HOUSES — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Toledo	St. Marks	wood	1	70	70	22	22	222	222	.07	.07
“	St. Peter's Lutheran	brick	3	58	65	14	12	153	135	.16	.16
“	Trinity Lutheran	“	3	83	93	11	10	132	117	.15	.15
“	Saler Lutheran	“	2	46	70	32	21	320	212	.04	.04
“	Emanuel Lutheran	wood	1	82	82	11	11	131	131	.12	.12
“	German Luth'rn orphanage	“	1	38	38	19	19	213	213	.20	.20
“	St. Marys	brick	13	52	83	16	12	208	140	.15	.12
“	Ursuline Convent	“	6	40	40	11	9	142	122	.17	.13
“	Ursuline (Cherry St.) con.	“	4	51	60	28	16	408	180	.12	.11
“	St. Stephens	brick	3	36	43	11	8	119	91	.25	.20
“	Good Shepherd	wood	3	46	55	25	15	323	200	.08	.07
“	St. Louis	“	4	36	38	16	12	157	84	.18	.09
“	Sacred Heart	brick	6	45	50	15	14	183	166	.23	.19
“	Immaculate Conception	wood	7	50	58	16	10	174	113	.07	.06
“	St. Patrick's	brick	7	44	56	21	17	261	200	.16	.15
“	St. Joseph	“	3	37	40	16	15	197	182	.12	.10
“	St. Michaels	“	3	37	45	24	20	313	260	.15	.15
“	St. Peters	“	6	43	58	19	14	228	164	.13	.11
“	St. John	“	2	54	65	21	19	274	245	.11	.11
“	St. Hedwig	wood	9	80	128	9	6	113	78	.11	.09
“	St. John College	brick	6	29	45	18	16	242	202	.25	. 21
“	St. Anthonys	“	12	65	98	13	8	167	105	.19	.17
“	St. Ann	stone	7	44	60	25	16	344	212	.09	.04
“	St. Francis de Sales	wood and brick	9	41	63	28	23	378	277	.09	.05
“	St. Jacobie	wood	1	30	30	104	104	2,083	2,083	.08	.08
“	Smead School (girls)	“	9	13	50	28	16	281	165	.30	.23
“	Newton School	“	12	40	50	21	17	252	204	.17	.17
“	Newton School, St. Clair St	brick	3	36	43	22	18	266	221	.16	.15
“	East Side Central	“	15	53	129	16	7	196	59	.18	.12
“	Jefferson	“	18	43	51	24	19	308	228	.12	.09
“	Franklin	“	18	48	63	20	15	240	181	.14	.14
“	Nebraska No. 1	“	12	38	45	24	20	288	245	.09	.09
“	Nebraska No. 2	“	9	40	45	20	18	261	236	.17	.14
“	Broadway	“	18	35	41	27	21	318	249	.15	.14
“	Waite School	“	16	41	49	20	17	251	184	.11	.08
“	Washington	“	18	44	73	21	12	259	145	.12	.11
“	Lagrange	“	14	39	46	21	18	251	213	.18	.18
“	Auburndale	“	12	43	49	20	18	276	239	.18	.16
“	Auburn	“	3	33	40	25	21	299	249	.09	.08
“	Sherman	“	19	45	53	21	18	245	222	.12	.11
“	Navarre	“	8	44	56	20	18	240	213	.17	.17
“	Raymer	“	8	45	54	20	17	242	200	.14	.14
“	Utah St., near Fort St.	“	10	39	48	23	19	275	225	.10	.10
“	Warren	“	12	45	49	20	18	268	239	.17	.16
“	Chase	“	10	44	51	19	17	227	171	.16	.11
“	Fulton	“	12	44	48	21	19	268	244	.17	.17
“	Parkland	“	8	36	49	29	17	300	223	.18	.18
“	Ontario	“	8	39	52	22	17	274	208	.16	.16
“	Spring	“	12	37	42	21	18	261	202	.17	.12
“	Detroit	“	9	39	50	24	18	279	216	.14	.07
“	Glenwood Annex	wood	5	40	50	22	16	244	180	.13	.12
“	Birmingham	brick	8	41	54	21	16	257	194	.15	.15
“	Ironville	“	5	36	45	24	19	318	253	.21	.21
“	Segur	“	11	43	53	20	17	245	198	.12	.12
“	Illinois	“	8	38	47	22	20	266	230	.15	.14
“	Hoag	“	11	37	42	22	15	272	180	.13	.07
“	Junction	“	8	33	37	28	25	341	308	.13	.13
“	Walbridge	“	11	37	48	23	18	284	219	.16	.16
“	Indiana	“	9	38	50	24	18	293	224	.17	.17
“	Newbury	“	12	39	45	21	19	293	255	.12	.12
“	Erie St.	“	12	44	54	49	40	585	476	.04	.04
“	Stickney	“	12	42	49	20	18	250	214	.12	.12
“	South St.	“	8	41	47	22	19	285	249	.15	.15
“	Monroe St.	“	8	42	53	21	17	265	212	.15	.15
Toronto	Fifth St.	“	7	40	42	18	17	250	240	.08	.08

TABLE I — SCHOOL HOUSES — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
stoves	windows	outdoor clos's	bad	well	250	
Smead	Smead	Smead	good	"	1,600	
"	"	"	"	"	80	
"	windows	outdoor priv's	"	"	300	
stoves	"	"	"	"	none	
"	"	"	"	"	farm	
furnace	"	"	bad	"	1,000	No fire precautions.
steam	"	closets	good	hyd. and well	5,800	
"	"	"	"	"	3,000	
stove	"	outdoor priv's	fair	well	2,550	
"	"	"	"	"	4,400	
"	"	"	"	"	none	
Smead	Smead	closets	good	"	3,300	
stove	windows	outdoor priv's	fair	"	400	
furnace	"	"	good	"	5,100	
"	"	"	bad	"	280	
steam	"	closets	good	"	6,500	
"	"	outdoor priv's	bad	"	700	
Smead	Smead	Smead	"	"	none	
stoves	windows	outdoor priv's	"	"	300	
hot water	"	"	good	hydrant	none	
steam	"	closets	"	well	300	
"	"	"	"	"	45,000	
"	"	outdoor priv's	"	hydrant	1,100	
stoves	"	"	"	well	3,300	
hot water	"	closets	"	hydrant	1,850	
Smead	Smead	"	"	"	4,500	
"	"	Smead	"	well and hyd.	2,500	
"	"	closets	"	hydrant	5,700	
"	"	"	"	"	3,300	
"	"	"	"	"	4,400	
Bryce	Bryce	"	"	"	6,200	
"	"	"	"	"	6,300	
"	Smead	"	"	"	4,600	
"	Bryce	"	"	"	6,700	
Smead	Smead	"	"	well and hyd.	5,800	
"	"	"	"	hydrant	2,200	
"	"	"	"	well	2,800	
"	"	outdoor priv's	"	"	2,100	
"	"	closets	fair	well and hyd.	3,300	
"	"	"	good	"	2,500	
"	"	"	"	hydrant	2,800	
"	"	"	"	"	8,300	
"	"	"	"	"	4,300	
"	"	"	"	well and hyd.	2,100	
"	"	"	"	hydrant	3,300	
"	"	"	"	"	2,100	
"	"	"	"	"	3,300	
"	"	"	"	"	3,300	
"	"	"	"	hyd. and well	3,300	
"	"	outdoor priv's	"	well	2,100	
"	"	closets	"	well and hyd.	3,300	
Bryce	Bryce	"	"	hydrant	3,300	
Smead	Smead	"	"	well and hyd.	1,800	
"	"	"	"	well	250	
"	"	"	"	hydrant	200	
"	"	"	"	hyd. and well	1,700	
Bryce	Bryce	"	"	hydrant	2,700	
Smead	Smead	"	"	"	3,300	
Bryce	Bryce	"	"	"	210	
Smead	Smead	"	"	well	2,600	
"	"	"	"	"	3,300	
Bryce	"	"	"	"	2,800	
Smead	"	"	"	hydrant	3,300	
steam	registers	outdoor priv's	"	cistern	3,500	

TABLE I — SCHOOL HOUSES — Continued.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Toronto	High School	brick	7	40	40	21	18	247	216	.17	.13
Trinway		“	2	....	....	....	....	......	......	....	....
Uhrichsville	High School	“	7	37	45	26	20	350	259	.19	.17
“	Main St.	“	9	34	45	23	18	305	229	.14	.14
“	West Side	“	8	35	45	21	13	257	174	.17	.12
Union City		“	7	37	50	21	14	224	172	.15	.12
Unionville Center		“	3	33	40	25	18	312	223	.15	.14
Upper Sandusky	South 8th St.	“	4	28	33	29	23	385	324	.19	.19
“	High School	“	9	46	58	19	15	265	203	.10	.08
Urbana	High School	“	9	....	....	....	....	......	......	....	....
“	North dist.	“	5	40	46	19	16	262	229	.24	.22
“	Central dist.	“	8	31	43	34	25	544	402	.14	.14
“	South Main	“	8	32	47	22	15	288	199	.23	.23
“	St. Marys	“	4	50	65	11	9	131	101	....	....
“	Urbana University	“	6	12	12	26	14	462	182	.21	.14
“	Corry School	“	5	25	25	26	6	421	77	.12	.09
Utica		“	4	40	50	20	14	297	216	.16	.16
“		“	1	45	45	15	15	161	161	.05	.05
Van Buren	Market and Elm	“	4	33	46	24	17	289	207	.11	.11
Vandalia	Nelson St.	“	3	28	34	24	15	306	190	.07	.07
Van Wert	1st Ward	“	8	39	50	28	22	418	324	.14	.14
“	2nd “	“	7	37	50	30	22	484	358	.15	.15
“	3rd “	“	18	44	57	23	16	422	283	.11	.08
“	4th “	“	4	47	55	20	17	291	252	.15	.15
Versailles		“	8	32	48	28	15	416	212	.22	.16
Vinton		wood	3	33	34	42	42	588	588	.18	.18
Wadsworth	Normal School	brick	2	27	32	23	21	229	212	.12	.08
“	Main St.	“	6	55	65	20	12	236	128	.13	.10
Wapakoneta	3rd Ward	“	10	40	52	33	26	493	376	.07	.06
“	Pearl St.	“	6	34	38	27	25	240	217	.14	.14
“	St. Josephs	“	4	41	45	24	22	312	286	.16	.14
Warren	Fulton St.	“	2	49	50	19	19	233	228	.13	.13
“	Prospect St.	“	2	39	40	24	24	293	285	.13	.13
“	East Market St.	“	9	....	....	....	....	......	......	.22	.13
“	First St.	“	3	37	42	22	15	272	190	.20	.20
“	Central Grammar	“	8	43	76	21	15	286	201	.17	.10
“	Tod Ave.	“	6	39	45	22	17	268	214	.20	.19
“	High School	“	9	35	270	*12	12	209	209	.20	.18
“	Elm St.	“	2	34	38	28	25	366	328	.13	.13
Washington C. H.	Central	“	12	40	40	19	19	262	262	.14	.14
“	East End	“	4	35	40	22	19	261	230	.14	.14
“	High School	“	11	22	....	....	....	......	......	.19	.05
“	Sunnyside	“	8	31	40	27	21	344	262	.16	.12
“	Shadyside	“	1	26	26	29	29	401	401	.27	.27
Waterville	Main	“	4	41	48	42	36	583	504	.09	.09
Wauseon	Clinton St. primary	wood	2	54	60	20	17	200	150	.24	.24
“	High School	brick	8	43	53	18	12	244	153	.33	.23
Waverly		“	10	42	58	15	10	208	134	.15	.13
“	Children's Home	“	1	12	12	44	44	394	394	.12	.12
Waynesfield		“	4	31	43	25	17	270	193	.09	.09
Waynesville	4th and Main	“	7	....	....	....	....	......	......	.11	.09
Wellington	South Main St.	“	9	50	154	21	13	331	206	.15	.12
“	North primary	“	1	40	40	26	26	399	399	.12	.12
Wellsville	Ninth St.	“	13	51	110	19	15	258	182	.18	.08
“	First St.	“	2	43	46	17	16	235	219	.20	.20
“	Eighteenth St.	“	4	51	56	15	13	211	180	.21	.20
West Alexandria	North Main St.	“	5	40	40	28	28	429	429	.13	.13
Western Star		wood	1	26	26	....	....	......	......	....	....
Westerville	High School	brick	7	36	50	25	18	375	252	.14	.12
West Jefferson	Union	“	6	27	35	20	15	309	241	.17	.17
West Leipsic		“	3	28	32	23	20	290	243	.20	.20
West Mansfield		“	5	37	41	21	20	306	279	.16	.14
West Mentor		“	4	22	35	31	20	469	302	.07	.06
West Milton		“	6	39	45	25	18	350	247	.15	.13
Weston	Walnut St.	“	6	44	55	20	14	289	192	.16	.14
West Salem	E. Buckeye St.	“	4	40	48	24	20	359	295	.12	.11

TABLE I — SCHOOL HOUSES — Continued.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
Peck-W'mson	Peck-W'mson	closets	good	cistern	2,000	
stoves	windows	outdoor priv's	....	....	....	
steam	fan	closets	good	hydrant	none	
"	windows	"	"	"	4,800	
hot water	"	outdoor priv's	fair	"	2,500	
stove	"	"	good	wells	1,200	
"	"	"	"	well	3,800	
Smead	Smead	closets	"	hydrant	2,400	
steam	shafts	"	"	"	9,700	
Smead	Smead	Smead	"	"	55,000	
"	"	"	"	"	11,500	
"	"	"	"	"	3,500	
"	"	"	"	"	8,800	
stoves	windows	outdoor priv's	"	"	4,800	
"	ventilators	closets	"	"	120,000	
"	windows	outdoor priv's	"	"	700	
furnace	"	"	fair	well	2,000	
stove	"	"	bad	wells	400	
Smead	Smead	"	good	well	1,800	
stoves	windows	"	"	"	4,000	
Peck-W'mson	Peck-W'mson	Peck-W'mson	"	hydrant	15,000	
Smead	Smead	dry closets	fair	"	21,000	
"	"	"	"	"	19,000	Poor closets and ventilation.
furnace	windows	indoor closets	bad	"	1,500	
Peck-W'mson	"	outdoor priv's	good	"	100	
stoves	"	"	bad	well	200	
Smead	Smead	"	good	hydrant	4,800	
furnace	shaft	"	"	"	9,700	
Smead	Smead	Smead	"	"	2,100	
"	"	"	"	"	5,000	
steam	shafts	closets	"	"	1,700	
furnace	gravity	outdoor priv's	fair	hyd. and well	1,200	
"	"	"	"	"	1,200	
"	fan	closets	good	hydrant	3,900	
"	gravity	outdoor priv's	bad	hyd. and well	1,600	
"	fan	closets	good	hydrant	4,300	
"	gravity	"	"	hyd. and well	3,100	
steam	windows	"	"	"	4,500	* Figured on assembly room only.
furnace	gravity	outdoor priv's	fair	"	....	
steam	registers	"	good	hydrant	12,000	No fire precautions.
furnace	"	"	"	"	7,600	
steam	"	"	"	"	12,100	
furnace	windows	"	"	"	3,000	
stove	"	"	fair	well	1,200	
Smead	Smead	"	good	"	10,000	
furnace	flues	closets	"	hydrant	125	
"	"	"	"	"	24,000	
stoves	windows	outdoor priv's	"	well	1 square	
"	"	"	"	cistern	19,000	
"	"	"	bad	well	14,400	
Smead	Smead	indoor closets	"	"	1,500	
steam	windows	outdoor priv's	good	cistern	3,000	
stove	"	"	"	"	4,800	
steam	"	outdoor clos's	"	hydrant	3,600	
Smead	Smead	"	"	"	2,400	
steam	ducts	outdoor priv's	"	"	2,400	
furnace	windows	"	"	well and hyd.	20,000	
"	"	"	....	....	....	
Smead ?	Smead ?	"	good	wells	3,300	
"	"	"	"	"	12,000	
stoves	windows	"	fair	"	1,900	
Vogelgesang	Vogelgesang	"	"	well	9,700	
furnace	windows	"	good	"	....	
"	"	"	"	"	7,000	
Smead	Smead	Smead	"	"	4,800	
"	"	outdoor priv's	"	"	14,000	

TABLE I — SCHOOL HOUSES — Concluded.

Place.	Name or locality of buildings.	Material.	Number of rooms.	Average No. of pupils per room.	Maximum No. of pupils per room.	Square feet of floor-space per capita.		Cubic feet of air-space per capita.		Ratio of window-area to floor-space.	
						Average.	Minimum.	Average.	Minimum.	Average.	Minimum.
Windham		wood	4	25	25	32	32	486	486	.18	.18
Wharton		brick	3	28	40	30	20	337	200	.09	.08
Williamsburg		"	6	40	60	16	10	218	127	.13	.13
Williamsport		"	4	28	36	52	39	646	473	.19	.05
Willoughby	High School	"	8	28	46	42	25	500	313	.08	.05
"	Union School	"	4	42	50	21	18	254	216	.20	.20
Willshire		"	5	28	51	40	16	359	188	.17	.16
Wilmington	Main b'ld'g	"	10	33	60	27	15	409	207	.14	.11
"	High School	"	6	33	33	25	23	328	306	.18	.16
Winton Place		"	7	41	50	28	15	236	195	.26	.26
Woodsfield		"	7	38	40	23	22	340	324	.10	.10
Wyoming		"	6	36	45	24	19	328	261	.21	.21
"	High School	"	3	23	28	37	30	519	420	.22	.22
Xenia	Central High	"	14	40	100	25	20	378	306	.14	.12
"	Cincinnati Ave.	"	4	40	40	18	18	239	239	.15	.15
"	Orient Hill	"	2	32	32	30	30	387	387	.17	.17
"	Spring Hill	"	8	36	35	26	26	341	341	.14	.12
"	East Main St.	"	3	39	56	22	18	280	238	.12	.12
"	East Market St.	"	9	33	35	27	26	346	341	.14	.10
Zanesfield		"	4	27	30	21	19	228	205	.14	.14
Zanesville	Monroe St.	"	6	39	49	22	11	317	174	.22	.21
"	Adamsville Road	"	4	39	42	24	16	317	204	.15	.11
"	Jackson	"	4	37	49	19	15	293	218	.25	.25
"	Columbia	"	8	36	38	27	24	397	369	.13	.11
"	Garfield	"	4	35	45	24	18	343	261	.26	.26
"	Grant	"	4	47	58	17	14	250	203	.26	.26
"	Moore b'ld'g	"	6	38	47	24	18	293	208	.15	.15
"	High School	"	9	36	48	25	19	295	224	.13	.13
"	Lincoln	"	8	40	45	22	20	292	260	.20	.17
"	Center St.	"	5	39	50	22	17	286	223	.14	.14
"	Old High School	"	4	37	42	31	26	372	309	.14	.11
"	Munson	"	2	44	48	20	19	307	278	.16	.16
"	McIntire	"	6	42	47	22	19	261	223	.13	.10
"	Madison St.	"	7	36	42	21	16	288	223	.22	.17
"	Moxahala	"	2	40	40	19	19	230	230	.24	.24
"	Stemler	"	4	36	50	27	20	436	316	.13	.13
"	Harvey	"	6	39	45	28	23	407	351	.15	.15
Zoar	Foltz St.	"	2	22	22	47	47	511	511	.19	.19

TABLE I — SCHOOL HOUSES — Concluded.

Heating.	Ventilation.	Closets, privies.	Condition of.	Water-supply.	Area of play-ground in square yard.	Remarks.
furnace	flues	outdoor priv's	good	well	7,000	
stoves	windows	"	fair	"	350	
"	"	"	good	"	7,200	
furnace	"	"	"	well & spring	....	
"	"	"	"	hydrant	8,500	
"	"	"	"	"	3,000	
"	"	closets	bad	well	1,000	
steam	"	outdoor priv's	fair	"	29,000	
furnace	"	dry closets	bad	"	17,000	
"	"	outdoor clos's	good	hyd. & cistern	2,000	
Smead	Smead	Smead (?)	"	well	10,000	
Bennett-Peck	Bennett-Peck	Bennett-Peck.	"	hydrant	20,000	
"	"	"	"	"	20,000	
steam	stacks	outdoor priv's	"	"	3,600	
stoves	windows	"	"	"	1,300	Will be abandoned at end of year.
furnace	underfloor	closets	"	"	2,200	
Smead	Smead	"	"	"	3,740	
stoves	windows	outdoor priv's	"	"	1,200	
Smead	Smead	"	"	"	2,740	
hot air	windows	"	very bad	well	3,600	
stoves	"	"	good	hydrant	4,800	Pupils in two rooms face windows.
"	"	"	fair	spring	4,840	
"	"	"	bad	hydrant	4,800	Pupils face wind'ws.
"	"	"	"	"	2,400	
Bartlett	Bartlett	closets	good	"	9,700	
Smead	Smead	"	"	"	12,000	
steam	windows	outdoor priv's	"	"	7,200	
steam	"	"	"	"	4,800	
Smead	Smead	Smead	"	"	7,200	
steam	windows	outdoor priv's	fair	"	200	
stoves	"	"	"	"	12,000	Pupils of one room face windows. No fire precautions.
"	"	"	"	"	7,200	
steam	"	"	good	"	7,200	Pupils face wind'ws.
"	"	"	bad	"	4,800	
stoves	"	"	"	"	....	
Smead	Smead	"	good	"	4,800	Pupils face wind'ws.
steam	windows	"	"	"	140	
stoves	"	"	fair	well	14,400	Waste water from well not drained off.

Table II.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Ada	South ward	4	....	....	......	....	9	4
Alger	Main St	1	....	....	......	....	8	1
"	" "	3	....	....	......	....	10	3
Alliance	N. Park Ave	6	....	....	194	2	15	6
"	Seneca Ave	8	....	....	......	....	15	8
"	Franklin Ave	4	14	1	177	3	....	....
"	E. State St	4	....	....	......	....	11	4
"	Broadway and Park	6	....	....	......	....	10	6
"	High School	7	....	....	......	....	8	7
Ansonia	W. Canal St	5	....	....	......	....	7	5
Apple Creek	Cemetery St	3	....	....	......	....	8	3
Arcadia	Walnut St	4	....	....	......	....	16	4
Archbold	Holland St	5	....	....	......	....	17	1
Arlington		6	....	....	......	....	9	6
Ashley	W. High St	5	14	1	......	....	....	....
Ashtabula	Catherine St	4	12	3	124	3	11	4
"	Columbus St	8	....	....	186	2	17	8
"	Division St. (High)	10	....	....	190	2	17	10
"	" " annex	4	13	1	130	2	12	4
"	Lake St	8	....	....	......	....	17	2
"	" " Cath	3	12	1	144	1	14	3
"	Market St. Cath	4	7	2	86	3	12	4
"	Prospect St	5	14	1	171	2	12	5
"	Station St	4	....	....	......	....	9	4
"	Tyler Ave	2	....	....	184	1	12	2
Ashville	High School	4	....	....	......	....	14	1
Athens	" "	1	....	....	......	....	14	1
Attica	High St	5	....	....	......	....	12	5
Bainbridge		6	....	....	......	....	9	6
Bakersville	Dover St	2	....	....	......	....	10	2
Barberton	Baird Ave	4	12	3	154	4	15	4
"	Cornell St	3	....	....	......	....	14	3
"	High St	2	....	....	......	....	8	2
"	River St	1	....	....	......	....	8	1
Barnesville	Church St	18	....	....	......	....	11	18
Beaverdam	Mill St	4	....	....	193	1	16	4
Bedford	Washington St	4	....	....	......	....	19	2
"	" "	4	11	3	168	2	12	4
Bellaire	4th ward Cath	6	19	4	124	4	11	6
"	Union St	4	....	....	......	....	14	4
"	Guernsey St	4	....	....	......	....	18	4
"	Kelley Rose Hill	4	12	1	125	4	11	4
"	Gravel Hill	6	....	....	......	....	15	6
"	Belmont	2	....	....	......	....	17	2
"	High School	9	....	....	......	....	9	9
"	Indian Run	4	....	....	......	....	18	4
Belle Center	Railroad St	8	14	1	197	1	....	....

TABLE II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Bellevue	New Central Bldg	8	....	....	......	....	19	2
"	Old " "	5	....	....	......	....	9	5
"	Pike	4	....	....	199	3	....	....
Belmont	Market and John	3	11	1	134	1	6	3
Berlin	E. Main St	4	....	....	......	....	8	4
Bethel	Union St	5	....	....	188	3	12	5
Bettsville	....	4	....	....	......	....	13	4
Blanchester	Main St	10	....	....	......	....	15	6
Bloomingburg	" "	5	10	1	183	1	9	5
Bluffton	Jackson	11	11	4	168	3	15	11
Bond Hill	Maple Ave	5	10	1	115	2	12	5
Bradford	School St	8	....	....	......	....	11	8
Bradner	Rented room	1	....	....	180	1	....	....
Bridgeport	Whitney and Bennett	9	....	....	198	1	....	....
"	Lincoln Ave	4	....	....	187	1	11	2
"	West End Bldg	4	....	....	177	1	14	4
Bryan	Butler St	4	....	....	......	....	18	4
"	Walnut St	2	....	....	......	....	19	2
"	Central bldg	8	....	....	......	....	13	8
Buchtel	Ray St	4	12	2	139	2	15	4
Bucyrus	Plymouth St	4	....	....	......	....	16	4
"	Cemetery St	4	....	....	192	1	17	4
"	Middleton St	18	....	....	......	....	9	18
Burbank	Church & Mill	2	....	....	......	....	9	2
Butler	College St	4	....	....	......	....	11	1
Byesville	High St	6	10	5	115	5	11	6
"	Race St	1	11	1	136	1	13	1
Cadiz	S. Ohio St	2	....	....	......	....	7	2
Caldwell	Main St	6	....	....	......	....	11	6
Caledonia	N. High St	4	14	1	180	1	15	2
Cambridge	Central bldg	10	....	....	......	....	11	10
"	West "	8	....	....	......	....	18	8
"	South "	12	....	....	......	....	16	12
"	East "	8	....	....	......	....	19	6
Camden	Central Ave	6	....	....	......	....	10	6
Canal Dover	Second St	7	....	....	......	....	14	7
" "	South Ave	4	....	....	......	....	14	4
" "	Oak Grove	18	....	....	197	1	....	....
Canal Winchester	S. Washington	6	11	5	128	5	10	4
Canton	E. 5th St	6	....	....	......	....	7	6
"	N. Cherry St	12	....	....	......	....	13	12
"	E. 8th St	8	14	1	192	1	19	1
"	Deuber Ave	8	....	....	......	....	19	8
"	Imaculate Conception	4	14	3	195	3	11	4
"	Woodland Ave	8	....	....	......	....	16	8
"	Clarendon Ave	6	....	....	......	....	18	6
"	Liberty St	9	10	1	142	1	12	1

Table II. — Continued.

Place	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Canton	McKinley Ave	13	12	1	175	1	15	6
"	High School	16	....	....	......	....	9	2
"	Hartford St	7	....	....	......	....	16	7
"	W. North St	8	....	....	......	....	16	8
"	Crystal Park	3	....	....	......	....	13	3
"	Market St	13	10	1	154	1	11	12
"	St. Peters	6	....	....	......	....	17	6
"	E. Fourth St.	8	....	....	......	....	18	8
Carey	South St.	7	....	....	......	....	13	7
Carlisle	Main St	4	....	....	......	....	19	4
Carroll	High St	4	....	....	......	....	6	4
Carthage	2nd & Jackson	3	....	....	......	....	15	3
Catawba	North St	3	....	....	......	....	12	3
Cecil	N. Main St	2	....	....	170	2	18	1
Cedarville	Xenia Ave	8	....	....	......	....	18	8
Celina	E. Wayne St.	5	....	....	......	....	18	5
"	High School	7	....	....	......	....	16	7
Centerburg	Preston St	5	....	....	......	....	9	5
Chagrin Falls	Philomathean St	9	....	....	......	....	10	6
Chester Hill	....	4	....	....	......	....	13	4
Chicago	Park St	11	12	1	96	3	8	11
Chillicothe	High School	7	....	....	162	2	12	7
"	Western Bldg	12	9	1	131	1	15	12
"	Eastern "	18	13	4	162	4	13	18
"	Central Bldg	7	....	....	192	1	....	....
"	Southern "	6	....	....	......	....	13	6
"	Old High School	4	14	1	163	1	9	4
"	Jackson Ave	8	12	2	143	3	18	8
"	E. High St.	6	....	....	......	....	18	4
"	Court St	18	....	....	......	....	6	18
"	St. Josephs	4	....	....	......	....	16	1
Clarksville	....	4	....	....	......	....	19	4
Cleveland Heights	Noble St	1	....	....	......	....	10	1
Cleves	....	6	....	....	......	....	14	6
Coal Grove	....	4	8	3	96	3	....	....
College Hill	Ohio Military Inst.	1	....	....	......	....	10	1
" "	Public School	6	11	3	......	....	14	6
Collinwood	Central	4	....	....	199	2	10	4
"	High School	7	....	....	......	....	14	1
Columbiana	Pittsburg St	7	13	1	144	3	....	....
Columbus	Sullivant Annex	2	....	....	......	....	12	2
"	Highand Ave Annex	1	....	....	196	1	....	....
"	Front and Long	15	9	1	106	1	7	15
"	Fulton St	12	....	....	......	....	11	12
"	Siebert St	10	12	2	124	2	18	4
"	Fifth Ave	14	9	2	129	2	19	2
"	23rd St	12	....	....	......	....	14	12

TABLE II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Columbus	South High	13	1	6	98	6	....	....
"	Fieser School	13	11	2	152	2	14	9
"	3rd St	8	....	....	......	....	17	4
"	Southwood Ave	8	....	....	......	....	13	8
"	Douglas	15	8	3	120	3	18	12
"	Franklinton	12	13	2	187	2	19	12
"	Main St	8	....	....	......	....	19	3
"	Spring St	8	14	2	179	2	....	....
"	Ohio Ave	20	10	1	137	3	9	4
"	Park & Vine	12	....	....	......	....	14	12
"	8th and Wesley	12	....	....	......	....	16	12
"	Stewart Ave	12	....	....	......	....	18	12
"	Avondale School	14	....	....	......	....	12	4
"	Central High	14	....	....	......	....	3	14
"	Sullivant	17	....	....	......	....	14	7
"	Chicago Ave	11	14	1	175	2	12	11
"	Beck St	9	....	....	163	1	14	1
"	Mound St	13	12	2	163	2	16	13
"	First Ave	13	14	1	194	1	....	....
"	Hubbard Ave	17	8	1	109	1	17	17
"	Rich St	6	....	....	184	1	13	6
"	4th St	2	....	....	......	....	13	2
"	" "	7	....	....	......	....	13	7
"	Fair Ave	12	....	....	......	....	18	12
"	Ninth Ave	8	....	....	......	....	9	8
"	2nd Ave	12	13	8	178	8	17	12
"	N. High School	13	....	....	......	....	16	4
"	Northwood Ave	8	....	....	......	....	14	8
Columbus Grove	Liberty	10	12	4	157	4	9	10
Commercial Point	......	3	....	....	......	....	5	3
Conneaut	Main St. Academy	2	13	1	139	2	....	....
"	Broad St	8	13	3	191	1	....	....
"	North Side	1	....	....	......	....	16	1
"	Main St	6	14	1	175	2	....	....
Convoy	Sycamore St	4	11	2	150	2	....	....
Corning	......	6	....	....	......	....	14	6
Coshocton	Sycamore St	6	....	....	......	....	17	6
"	High School	8	....	....	......	....	10	8
"	Walnut St	10	....	....	......	....	9	10
Covington	High School	11	....	....	......	....	13	11
Crestline	East Bldg	4	....	....	......	....	13	4
"	West "	9	13	8	165	6	17	9
Creston	S. Main St	4	....	....	......	....	8	4
Cridersville	High St	4	14	1	......	....	16	4
Crooksville	State St	4	....	....	......	....	9	4
Croton	......	4	....	....	......	....	11	4
Cumberland	......	4	....	....	......	....	3	4

TABLE II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Dalton	....	3	....	....	......	....	10	3
Danville	Grammar School	1	9	1	81	1	....	....
”	High School	4	....	....	144	4	....	....
Dayton	Central dist	17	....	....	......	....	5	17
”	5th dist	15	....	....	......	....	12	15
”	” ” annex	4	....	....	179	4	12	4
”	7th dist	12	....	....	......	....	16	12
”	” ” annex	4	....	....	......	....	10	4
”	19th dist	15	10	1	127	1	8	15
”	15th ”	12	....	....	......	....	16	12
”	20th ”	16	....	....	......	....	18	8
”	13th ”	12	....	....	......	....	18	12
”	12th ”	14	13	1	......	....	5	2
”	4th ”	14	....	....	......	....	9	14
”	8th dist	12	....	....	......	....	14	12
”	” ” annex	4	....	....	123	4	13	4
”	14th dist	15	....	....	......	....	13	15
”	” ” annex	5	8	1	75	4	9	5
”	Holy Rosary	5	11	3	128	3	15	5
”	St. Marys	6	11	4	134	4	19	4
”	St. Marys annex	2	11	2	130	2	17	2
”	St. Johns	4	10	2	120	2	12	4
”	Trinity (Parochial)	4	10	1	112	4	18	4
”	” ” boys	4	12	2	150	2	12	4
”	St. Paul Lutheran	3	....	....	......	....	15	3
”	St. Mary's Institute	17	14	1	184	2	6	17
”	Christ's School	1	....	....	......	....	13	1
”	St. Joseph's	5	....	....	......	....	14	5
”	” ” annex	3	....	....	......	....	8	3
”	Emanuel	8	13	4	177	4	14	7
”	9th dist	15	....	....	......	....	8	15
”	” ” annex	2	14	2	133	2	19	2
”	3rd dist	8	....	....	......	....	9	8
”	18th ”	9	14	1	166	1	12	6
”	10th ”	13	....	....	......	....	13	5
”	Herman Ave	19	....	....	......	....	10	19
”	17th dist	16	....	....	......	....	13	16
”	11th ”	8	....	....	......	....	17	4
”	Manual training	6	....	....	......	....	11	2
”	12th dist annex	6	....	....	184	1	....	....
”	Allen dist	16	....	....	......	....	19	16
Defiance	St. John's	1	....	....	183	1	15	1
”	English Cath	3	14	3	167	3	....	....
”	German ”	3	12	3	173	3	11	3
”	Clinton St. annex	2	10	2	124	2	15	2
”	2nd Ward	4	....	....	......	....	18	4
”	St. Paul's Luth	1	....	....	......	....	11	1

TABLE II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
De Graff	....	8	....	....	......	....	12	8
Delaware	South Bldg	8	....	....	......	....	19	1
"	Henry St	4	14	3	168	3	14	4
"	High School	9	11	2	135	2	9	9
Delphos	Franklin St	8	....	....	......	....	18	8
"	Jefferson St	9	....	....	......	....	10	9
"	South	1	14	1	130	1	10	1
"	German	4	....	....	......	....	8	4
"	Parochial	6	14	1	......	....	11	6
Dennison	Logan St	8	....	....	173	4	7	8
"	3rd St	9	....	....	183	1	16	9
Dillon	....	1	11	1	129	1	17	1
"	....	1	....	....	......	....	10	1
Dillonvale	....	5	9	4	93	4	12	5
Dresden	Chestnut St	7	....	....	......	....	14	7
Dublin	....	4	....	....	......	....	12	4
Dunkirk	Main St	8	....	....	......	....	15	8
Dupont	....	3	....	....	......	....	19	3
East Cleveland	Prospect St	8	....	....	......	....	18	8
" "	Superior St	8	....	....	......	....	18	8
East Liverpool	Central	18	14	1	165	1	9	18
" "	5th St	8	....	....	......	....	15	8
" "	Pleasant Heights	1	....	....	180	1	14	1
" "	Gardendale Ave	1	....	....	180	1	14	1
" "	3rd St	4	....	....	......	....	16	2
" "	Sheridan	2	....	....	......	....	12	2
" "	Ambrose Ave	2	....	....	......	....	19	2
" "	Trentdale	1	14	1	164	1	18	1
" "	Grant St	8	....	....	......	....	14	8
" "	West End	4	....	....	......	....	17	2
East Palestine	Wood St	11	14	1	196	1	8	11
Eaton	Barron St	12	....	....	......	....	14	12
Edgerton	Elm St	6	....	....	......	....	7	6
Elyria	High School	12	....	....	......	....	7	12
Eldorado	Main Cross	3	....	....	184	1	18	1
Elmore	....	5	....	....	......	....	6	5
Elmwood Place	Maple St	8	14	2	172	2	11	8
Emerson	White	1	....	....	......	....	13	1
"	Colored	1	....	....	......	....	11	1
Enon	....	4	....	....	......	....	9	4
"	High School	1	....	....	......	....	18	1
Felicity	....	4	....	....	......	....	8	4
Fern Bank	....	2	....	....	......	....	17	2
Findlay	Central	8	....	....	......	....	11	11
"	High School	11	....	....	......	....	9	11
"	Blanchard Ave	2	....	....	......	....	12	2
"	W. Lincoln St	4	....	....	......	....	11	4

TABLE II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Findlay	Adams	4	....	....	......	....	18	4
”	Howard	8	....	....	......	....	14	8
”	Taylor	8	....	....	......	....	14	8
”	Crawford	8	....	....	......	....	12	8
”	Biglow	4	....	....	195	1	16	4
”	Hobart Ave	3	....	....	......	....	13	3
”	St. Michaels	5	13	1	180	2	10	5
Forest	....	6	....	....	188	2	12	6
Fostoria	Central	7	....	....	......	....	13	6
”	1st Ward	8	....	....	......	....	19	8
”	2nd ”	4	....	....	185	2	....	....
”	4th ”	4	14	1	168	4	....	....
”	5th ”	4	....	....	178	2	....	....
”	St. Wendelin	4	9	3	108	4	8	4
Fort Jennings	Water St	1	....	....	......	....	10	1
” ”	Water & 1st	2	....	....	......	....	12	2
Frankfort	Colored	1	....	....	......	....	3	1
”	White	5	....	....	......	....	2	5
Frazeysburg	....	6	....	....	......	....	12	6
Fredericktown	....	6	....	....	......	....	18	4
Galion	Lutheran (Paroch)	2	....	....	......	....	7	2
”	St. Joseph's ”	2	....	....	......	....	15	2
”	North	3	....	....	198	1	....	....
”	East	6	....	....	......	....	19	4
”	West	14	....	....	......	....	11	14
”	South	4	14	1	168	2	....	....
”	St. Patricks	2	....	....	191	2	17	2
Gallipolis	High	4	....	....	......	....	19	3
”	Grant	3	....	....	197	2	....	....
”	Washington No. 2	9	....	....	......	....	8	1
”	Garfield	3	....	....	190	2	....	....
Geneva	High	6	....	....	......	....	16	3
”	Eagle St	9	....	....	......	....	18	9
Germantown	....	10	....	....	......	....	7	10
Girard	High	3	....	....	......	....	13	1
”	Main St	4	....	....	198	1	19	2
”	Market & Abbey	2	14	1	199	1	....	....
Glendale	Congress Ave	6	....	....	......	....	17	6
Glouster	Republic St	4	....	....	......	....	8	4
Grafton	Mechanic St	6	....	....	188	3	....	....
Grand Rapids	....	4	....	....	......	....	12	4
Graysville	....	2	....	....	176	1	10	2
Green Camp	....	4	....	....	......	....	19	4
Greenspring	....	5	....	....	......	....	12	5
Greenville	W. Fourth St.	12	14	1	184	1	10	12
”	High	10	....	....	......	....	9	10
”	St. Marys (Paroch)	2	....	....	......	....	10	2

TABLE II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Greenwich	Seminary St	4	....	....	......	....	17	4
Groveport	High	5	....	....	......	....	16	3
Hamilton	4th Ward	14	13	1	189	1	11	4
"	Central High	9	....	....	......	....	12	4
"	2nd Ward	12	....	....	......	....	12	12
"	5th Ward	14	....	....	......	....	12	14
Hamler		3	13	1	151	1	11	3
Hanging Rock	Center St	4	....	....	......	....	15	4
Hanover		3	....	....	......	....	15	3
Hartwell	Woodbine Ave	10	14	1	184	1	9	10
Haskins	Maple & Middleton.	3	....	....	......	....	12	3
Hicksville	Main & South	12	14	15	188	5	18	9
Hillsboro	Washington	11	....	....	......	....	14	11
"	Webster	8	....	....	......	....	17	8
Holgate	Wilhelm & Frazier	6	....	....	194	1	....	....
Hollansburg		3	....	....	......	....	19	1
Holmesville		2	....	....	......	....	18	1
Hopedale	Church St	2	....	....	......	....	12	2
Hudson	Division St	5	....	....	182	1	10	5
Huntsville	Napoleon St	4	....	....	196	1	19	4
Huron	Williams St	1	....	....	189	1	....	....
"	High	8	....	....	......	....	8	8
Jackson Center	Pike St	2	....	....	......	....	11	2
" "	High	2	....	....	......	....	13	2
Jeffersonville	Water St	6	....	....	......	....	9	6
Jenera		1	....	....	......	....	12	1
Jerry City		4	....	....	......	....	19	4
Jewett	W. Main St	1	....	....	159	1	8	1
"	Main St	4	14	1	164	2	17	4
Kelley's Island	Estes High School.	6	....	....	......	....	18	6
Kent	Depoyster St	4	....	....	199	1	....	....
"	Central	9	....	....	......	....	9	9
"	South	6	....	....	......	....	15	6
Kenton	North	3	....	....	......	....	12	3
"	South	4	....	....	......	....	16	4
"	West	4	9	4	119	4	....	....
Kimbolton		3	....	....	199	1	11	3
Kirby		1	....	....	......	....	6	1
Kossuth	Main St	2	....	....	......	....	6	2
Lakeside		1	....	....	......	....	17	1
Lakewood	South Bldg	2	....	....	......	....	12	2
"	East "	4	....	....	......	....	11	2
"	Central Grade	4	....	....	......	....	18	4
"	East (annex)	2	....	....	......	....	19	4
Lancaster	West Side	4	....	....	......	....	10	4
"	Walnut St	12	....	....	......	....	10	12
"	North bldg	14	....	....	......	....	6	14

TABLE II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Lancaster	East Bldg	8	....	....	......	....	12	8
La Rue		7	....	....	......	....	15	7
Laura		3	....	....	......	....	16	3
Leetonia		9	....	....	......	....	10	9
”		4	....	....	......	....	14	4
Lima	Lincoln St	9	....	....	173	1	10	9
”	Kilby Colony	1	....	....	170	1	10	1
”	Franklin	12	....	....	......	....	11	4
”	” annex	4	....	....	......	....	10	1
”	Washington	11	....	....	149	3	12	5
”	” annex	2	....	....	160	2	16	2
”	High School	9	....	....	......	....	7	8
”	Whittier	5	....	....	......	....	14	4
”	St. John	3	....	....	153	2	12	3
”	Lowell	5	11	4	150	4	....	....
”	St. Rosa	8	12	4	173	4	....	....
Lockland	West	2	....	....	194	1	11	2
”	Public	10	....	....	......	....	16	8
Lodi		5	....	....	......	....	6	5
Logan	High School	5	....	....	......	....	5	5
”	Primary	12	13	5	188	4	....	....
Loudonville	Wood St	9	12	1	164	1	11	9
Louisville		5	....	....	......	....	10	5
Loveland	West bldg	2	....	....	......	....	16	2
Madisonville		12	11	6	132	9	14	12
Malinta	Henry St	2	....	....	......	....	18	2
Mansfield	Newman St	4	....	....	190	1	17	4
”	W. 5th St	8	....	....	......	....	13	8
”	St. Peters	4	11	1	144	1	10	4
”	Marion Ave	8	12	1	179	1	11	8
”	Hedges St	11	....	....	......	....	14	11
”	Bowman St	10	....	....	......	....	11	10
Marblehead	Main St	4	....	....	......	....	6	4
Marion	Forest Lawn	6	....	....	......	....	17	6
”	Davids St	3	....	....	......	....	18	3
”	Lincoln	6	14	1	198	1	....	....
”	High School	6	....	....	......	....	10	2
”	St. Mary's	7	12	3	139	3	4	7
”	Central bldg	13	13	1	129	1	9	13
”	N. State St	8	....	....	......	....	14	8
Martins Ferry	4th St	10	....	....	......	....	10	8
” ”	South Ward	10	....	....	195	1	17	1
Maumee	Conneaut & Broadway	5	....	....	......	....	14	5
McArthur	High St	6	....	....	176	2	14	1
McComb		8	13	4	184	4	....	....
McConnelsville		8	8	2	100	2	13	8
Mechanicsburg	E. High St	10	....	....	......	....	17	8

TABLE II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Medina	High School	6	....	....	......	....	15	6
”	Primary	4	14	4	172	4	....	....
Melrose	Franklin St	3	....	....	......	....	16	3
Metamora		2	....	....	......	....	19	2
Maimsburg	4th & Main	4	....	....	184	3	18	4
”	” ” No. 1	6	14	2	144	2	12	6
”	” ”	2	....	....	......	....	14	2
”	” ”	2	....	....	......	....	13	2
”	” ”	2	....	....	148	2	17	2
Middleport	Central	10	10	4	152	1	12	10
“	Colored	3	....	....	......	....	17	3
“	5th Ward	1	....	....	......	....	16	1
Middletown	Central bldg	12	....	....	......	....	15	8
”	North ”	10	....	....	......	....	19	4
”	East ”	4	....	....	......	....	12	3
Milford Center		6	....	....	......	....	17	6
Mineral City		8	....	....	......	....	10	8
Mineral Ridge	Main St. No. 1	4	....	....	......	....	8	4
” ”	” ” No. 2	2	....	....	......	....	7	2
Minerva		6	....	....	......	....	8	6
Mingo Junction	Franklin	6	12	3	150	4	11	6
Monroeville	Broad St	6	....	....	......	....	17	6
Morristown	Church St	3	....	....	......	....	18	1
Morrow	Mac Clave	6	....	....	185	2	17	6
Moscow	4th & Wells Ave.	4	....	....	......	....	8	4
Mt. Pleasant.	Colored	1	....	....	......	....	14	1
”	High School	4	....	....	......	....	10	2
Mt. Sterling	Public	6	....	....	......	....	16	6
”	High	3	....	....	......	....	11	3
Mt. Healthy		7	....	....	149	3	12	7
Mt. Cory		1	....	....	......	....	8	1
”	Main Cross St.	2	....	....	......	....	10	2
Mt. Vernon	Central	7	....	....	179	4	16	3
”	High	10	....	....	......	....	13	3
”	Davis bldg	4	....	....	......	....	18	4
Mt. Washington		3	....	....	......	....	19	3
Murray City	Locust St	6	12	3	119	5	6	6
Napoleon	Catholic	2	....	....	178	1	14	2
”	Union Schools	11	14	1	184	2	7	10
”	South Ward	2	....	....	......	....	17	2
Navarre		5	....	....	181	2	9	5
Nelsonville	First Ward	5	....	....	182	1	14	5
”	Central	12	....	....	168	1	19	6
”		8	14	3	177	4	12	8
Newark	E. Main St.	8	....	....	......	....	14	8
”	” ” overflow.	1	....	....	......	....	16	1
”	Mill St	6	....	....	......	....	10	6

TABLE II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Newark	Texas bldg	2					16	2
”	S. 3rd St	4					13	4
”	Franklin	1					16	1
”	N. 4th St	8					16	8
”	Central	12			169	5	10	12
”	Wood Side	4			140	2	9	4
”	5th St	7					13	7
”	High School	6					15	6
“	West End	6					15	6
“	” ” No. 2	3			182	1	13	3
“	St. Frances de Sales	8	12	5	148	6	12	8
New Carlisle		8					13	7
Newcomerstown	State St	8					16	6
”	College St	8					16	6
New Concord		4					15	4
New Knoxville		3					8	3
New Lexington		11					5	11
New London		6					11	6
New Philadelphia	Central	15	14	1			14	1
” ”	West End	8					12	4
” ”	South Side	3					11	3
New Richmond	Market St	8					12	8
” ”	Primary	1					16	1
” ”	Catholic	1					10	1
New Riegel	Perry St	1					7	1
” ”	Findle St	4					5	4
New Straitsville		10	6	4	83	5	13	10
New Washington	Kibler St	4					14	4
New Waterford		3					15	3
North Baltimore		4					12	4
” ”	North bldg	6					14	6
” ”	Central bldg	5					17	4
North Lewisburg		4					16	4
North Robinson		2					15	2
Norwood	Allison St	8					18	8
Oak Harbor		8					4	8
Oberlin	Central	9			189	1	8	9
Olmsted Falls		3					13	3
Ottawa	High School	8					9	5
”	Walnut & 3rd	5			163	1	16	5
Otway		3					14	2
Orrville		8					9	8
Osgood		2	14	1	180	1	2	2
Ostrander		4					15	4
Oxford		8					11	8
Painesville	Parochial	4					12	4

TABLE II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Painesville	Washington St	7	....	....	......	....	11	7
"	Jackson St	6	....	....	......	....	16	6
"	St. Clair St	4	....	....	......	....	15	4
"	State St	4	....	....	......	....	18	4
Pataskala	Main St	6	....	....	......	....	10	6
Patterson	....	3	....	....	175	1	9	3
Paulding	....	10	....	....	......	....	14	10
Pemberville	Pine & College	6	14	1	191	1	16	3
"	Cedar St	1	....	....	......	....	10	1
Piketon	....	5	....	....	149	1	12	5
Pioneer	....	4	....	....	......	....	17	4
Plain City	....	8	....	....	......	....	15	3
Pleasant City	....	6	....	....	180	2	12	6
Pleasant Hill	....	5	....	....	......	....	16	5
Pleasant Ridge	....	6	....	....	183	2	17	4
Pleasantville	....	6	....	....	......	....	8	5
Portsmouth	High St	2	....	....	......	....	12	2
"	2nd St	8	12	2	118	2	4	8
"	Vinton Ave	1	....	....	192	1	....	....
"	Earlytown	2	....	....	153	1	2	2
"	11th St	5	....	....	......	....	17	1
"	6th St	5	....	....	......	....	8	5
"	Union St	12	13	2	187	1	....	....
"	Offnere St	8	12	2	184	2	....	....
"	High School	5	12	1	174	1	....	....
Prospect	....	6	13	1	184	1	15	1
Put-in-Bay	Central	3	....	....	......	....	8	3
"	East Point	1	....	....	......	....	14	1
Quaker City	....	6	....	....	......	....	18	2
Ravenna	W. Main St	2	....	....	......	....	17	2
"	Chestnut St	9	....	....	......	....	4	9
"	High School	3	....	....	......	....	10	3
"	Catholic	2	....	....	......	....	8	2
Rawson	....	4	....	....	......	....	13	4
Reading	....	8	....	....	......	....	18	8
"	Vine St., main bldg.	4	10	4	118	4	15	2
"	" " small "	1	11	1	122	1	14	1
Republic	....	4	....	....	......	....	14	4
Richmond	....	3	12	1	121	2	15	3
Richwood	Ottawa	7	14	1	190	1	....	....
Rockport	High School	4	....	....	......	....	14	4
"	Truscott Road	2	....	....	171	1	17	2
"	Lindale Road	2	....	....	......	....	15	2
"	Southern part	1	....	....	......	....	14	1
Rushsylvania	....	4	....	....	......	....	12	4
St. Clairsville	Main St	6	13	3	185	3	19	6
St. Marys	East side	11	....	....	......	....	16	1

Table II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
St. Marys	2nd Ward	2	....	....	......	....	16	2
St. Paris		7	....	....	......	....	11	7
Salesville		3	....	....	......	....	9	3
Salineville	Main St	8	10	3	152	1	17	8
"	West End	1	....	....	......	....	19	1
"	Church St	3	....	....	182	1	....	....
Sandusky	Central School	9	14	1	194	1	9	9
"	10th Ward	11	....	....	149	3	11	3
"	9th Ward	8	....	....	......	....	17	8
"	8th Ward	12	....	....	......	....	10	12
"	6th Ward	6	14	1	196	1	18	3
"	4th Ward	7	....	....	......	....	15	7
Scio		7	14	1	186	1	8	7
Scott		4	14	1	181	2	16	3
Shawnee	Walnut St	6	....	....	198	1	10	6
"	Chestnut St	5	11	3	138	3	7	5
Shreve		6	....	....	......	....	9	6
Sidney	Holy Angels	5	....	....	......	....	12	5
"	1st Ward	2	....	....	......	....	14	2
"	Central	12	....	....	......	....	12	10
"	4th Ward	3	....	....	......	....	18	3
"	3rd Ward	8	....	....	195	1	....	....
"	2nd Ward	4	....	....	194	1	....	....
Smithfield		4	....	....	......	....	8	4
Smithville		4	....	....	195	1	19	1
Somerset	Main & High	6	....	....	......	....	10	6
"	Holy Trinity	4	10	2	103	3	16	2
South Bloomfield		3	....	....	......	....	6	3
South Brooklyn	Pearl St	8	14	1	171	3	10	8
" "	St. Marcus	1	14	1	144	1	9	1
" "	Catholic	2	12	2	147	2	9	2
" "	Moulton Ave No. 1	4	....	....	......	....	9	4
" "	" " No. 2	4	....	....	......	....	19	4
South Lebanon		3	....	....	......	....	10	3
Sparta		3	....	....	......	....	8	3
Spencerville		11	....	....	......	....	5	11
Springboro		4	....	....	......	....	1	4
Springfield	High & Factory	9	....	....	158	1	14	9
"	High School	16	....	....	......	....	14	11
"	South bldg	8	....	....	......	....	14	8
"	Clifton	14	....	....	......	....	14	9
"	North St	3	....	....	......	....	4	3
"	Lincoln	8	....	....	......	....	14	8
"	McKinley	9	....	....	......	....	11	9
"	Garfield	8	13	2	180	1	11	8
"	Western	10	12	6	152	4	9	10
"	Oakland	3	14	1	......	....	10	3

TABLE II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Springfield	Grey Hill	9	....	....	191	2	16	5
"	Fair St	3	....	....	......	....	13	3
"	Lagonda	6	....	....	......	....	12	6
"	Shaffer St	8	....	....	......	....	12	8
"	Northern College	18	....	....	......	....	17	11
"	Washington	9	....	....	......	....	11	9
Spring Valley		4	11	1	121	1	8	4
Startle		2	....	....	......	....	9	2
Steubenville	Stanton	12	....	....	......	....	10	12
"	Washington	8	....	....	......	....	15	8
"	Garfield	7	....	....	......	....	15	8
"	St. Peter's	5	....	....	......	....	11	5
"	Grant	10	....	....	......	....	9	10
Strasburg		4	....	....	......	....	14	3
Stryker		7	....	....	......	....	11	7
Sugar Grove		3	....	....	......	....	12	3
Summerfield		3	....	....	175	2	12	3
Swanton		5	12	1	148	1	11	5
Sycamore		4	....	....	198	1	11	4
Sylvania		5	....	....	176	1	4	5
Thornville		4	....	....	......	....	6	4
Tiffin	Columbian	9	....	....	......	....	12	9
"	Union bldg	10	....	....	......	....	5	10
"	College Hill	4	....	....	......	....	8	4
"	Minerva	6	....	....	......	....	9	6
"	St. Mary's	3	....	....	......	....	7	3
"	St. Joseph's	8	13	2	187	1	....	....
"	Jackson & Miami	8	....	....	......	....	17	8
Tippecanoe City		9	13	1	175	1	14	6
Tiro		3	....	....	185	1	8	3
Toledo	St. Mark's	1	....	....	......	....	7	1
"	St. Peter's	3	12	2	135	3	16	3
"	Trinity Lutheran	3	10	3	117	3	15	3
"	Salen Lutheran	2	....	....	......	....	4	2
"	Emanuel Lutheran	1	11	1	131	1	12	1
"	St. Mary's	13	12	5	140	6	12	13
"	Ursulin Convent Collinwood St	6	9	5	122	5	13	6
"	Ursulin Convent Cherry St	4	....	....	180	1	11	4
"	Good Shepherd	3	....	....	......	....	7	3
"	St. Louis	4	12	2	84	3	9	2
"	Sacred Heart	6	14	2	166	5	19	1
"	Inmaculate Conception	7	10	3	113	5	6	7
"	St. Patrick's	7	....	....	......	....	15	6
"	St. Joseph's	3	....	....	182	1	10	3

TABLE II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Toledo	St. Michael's	3	....	....	......	....	15	3
"	St. Peter's St. Clair St.	6	14	1	164	2	11	6
"	St. John	2	....	....	......	....	11	2
"	St. Hedwig	9	6	9	78	9	9	9
"	St. Anthony's	12	8	10	105	10	17	3
"	St. Stephen's	3	8	3	91	3	....	....
"	St. Ann	7	....	....	......	....	4	7
"	St. Francis de Sales	9	....	....	......	....	5	9
"	St. Jacobie	1	....	....	......	....	8	1
"	Newton School No. 1	12	....	....	......	....	17	12
"	" " No. 2	3	....	....	......	....	15	2
"	East Side Central	15	7	1	59	1	12	7
"	Jefferson	18	....	....	......	....	9	18
"	Franklin	18	....	....	181	1	14	18
"	Nebraska No. 1	12	....	....	......	....	9	12
"	" No. 2	9	....	....	......	....	14	9
"	Broadway	18	....	....	......	....	14	18
"	Waite School	16	....	....	184	1	8	16
"	Washington School	18	12	1	145	1	11	18
"	Lagrange	14	....	....	......	....	18	14
"	Auburndale	12	....	....	......	....	16	12
"	Auburn	3	....	....	......	....	8	3
"	Sherman	19	....	....	......	....	11	19
"	Navarre	8	....	....	......	....	17	8
"	Smead School	9	....	....	165	1	....	....
"	Chase School	10	....	....	171	2	11	10
"	Glenwood annex	5	....	....	180	1	12	5
"	Raymer	8	....	....	......	....	14	8
"	South East	10	....	....	......	....	10	10
"	Warren	12	....	....	......	....	16	12
"	Fulton	12	....	....	......	....	17	17
"	Parkland	8	....	....	......	....	18	8
"	Ontario	8	....	....	......	....	16	8
"	Spring	12	....	....	......	....	12	12
"	Detroit	9	....	....	......	....	7	9
"	Birmingham	8	....	....	194	1	15	8
"	Segur	11	....	....	......	....	12	11
"	Illinois	8	....	....	......	....	14	8
"	Hoag	11	....	....	180	1	7	11
"	Junction	8	....	....	......	....	13	8
"	Walbridge	11	....	....	......	....	16	11
"	Indiana	9	....	....	......	....	17	9
"	Newbury	12	....	....	......	....	12	12
"	Erie St	12	....	....	......	....	4	12
"	Stickney	12	....	....	......	....	12	12
"	South St	8	....	....	......	....	15	8

TABLE II. — Continued.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Toledo	Monroe St	8	....	....	......	....	15	8
Toronto	Central	7	....	....	......	....	8	7
"	High School	7	....	....	......	....	13	7
Uhrichsville	" "	7	....	....	......	....	17	5
"	Main St	9	....	....	......	....	14	9
"	West Side	8	13	2	174	3	12	6
Union City	....	7	14	1	172	3	12	7
Unionville Center	....	3	....	....	......	....	14	3
Upper Sandusky	....	4	....	....	......	....	19	4
" "	High School	9	....	....	......	....	8	9
Urbana	Central dist	8	....	....	......	....	14	8
"	S. Main St	8	....	....	199	1	....	....
"	Urbana University	6	14	1	182	1	14	3
"	St. Mary's	4	9	3	101	3	....	....
"	Curry School	5	....	....	77	4	....	....
Utica	....	1	....	....	161	1	5	1
"	....	4	14	1	......	....	16	4
Van Buren	....	4	....	....	......	....	11	4
Vandalia	Nelson St	3	....	....	190	1	7	3
Van Wert	1st Ward	8	....	....	......	....	14	8
" "	2nd "	7	....	....	......	....	15	7
" "	3rd "	18	....	....	......	....	8	18
" "	4th "	4	....	....	......	....	15	4
Versailles	....	8	....	....	......	....	16	1
Vinton	....	3	....	....	......	....	18	3
Wadsworth	Normal School	2	....	....	......	....	8	2
"	Main St	6	12	2	128	2	10	4
Wapakoneta	3rd Ward	10	....	....	......	....	6	10
"	Pearl St	6	....	....	......	....	14	6
"	St. Joseph's	4	....	....	......	....	14	4
Warren	Fulton St	2	....	....	......	....	13	2
"	Prospect St	2	....	....	......	....	13	2
"	First St	3	....	....	190	1	....	....
"	E. Market St	9	....	....	......	....	13	1
"	Central grammar	8	....	....	......	....	10	9
"	Tod Ave	6	....	....	......	....	19	2
"	Elm St	2	....	....	......	....	13	2
"	High School	9	12	1	......	....	18	2
Wauseon	Clinton St	2	....	....	150	1	....	....
"	High School	8	12	2	153	2	....	....
Waverly	....	10	10	5	134	5	13	9
"	Children's Home	1	....	....	......	....	12	1
Waterville	Main St	4	....	....	......	....	9	4
Waynesfield	....	4	....	....	193	1	9	4
Waynesville	....	7	....	....	......	....	9	7
Wellington	S. Main St	9	13	1	......	....	12	9
"	Primary	1	....	....	......	....	12	1

Table II. — Concluded.

Place.	Name or location of building.	Number of rooms.	Minimum square feet floor-space per capita.	Number of rooms below minimum of 15 square feet.	Minimum air space per capita.	Number of rooms below minimum of 200 cubic feet.	Minimum ratio of window area to floor space in %.	Number of rooms below 20% ratio.
Wellsville	Ninth St	13	....	....	182	1	8	1
”	18th St	4	13	2	180	1	....	....
West Alexandria		5	....	....	....	....	13	5
Westerville		7	....	....	....	....	12	7
West Jefferson		6	....	....	....	....	17	6
West Mansfield		5	....	....	....	....	14	5
West Mentor		4	....	....	....	....	6	4
West Milton		6	....	....	....	....	13	5
Weston		6	14	1	192	1	14	4
West Salem		4	....	....	....	....	11	4
Windham		4	....	....	....	....	18	4
Wharton		3	....	....	....	....	8	3
Williamsburg		6	10	2	127	2	13	6
Williamsport		4	....	....	....	....	5	2
Willoughly	High School	8	....	....	....	....	5	8
Willshire		5	....	....	188	2	16	5
Wilmington	Main bldg	10	....	....	....	....	11	10
”	High School	6	....	....	....	....	16	5
Winton Place		7	....	....	195	1	....	....
Woodsfield		7	....	....	....	....	10	7
Washington C. H.	Central	12	....	....	....	....	14	12
” ”	East End	4	....	....	....	....	14	4
” ”	High School	11	....	....	....	....	5	9
” ”	Sunny Side	8	....	....	....	....	12	4
Xenia	Central High	14	....	....	....	....	12	14
”	Cincinnati Ave	4	....	....	....	....	15	4
”	Orient Hill	2	....	....	....	....	17	2
”	Spring Hill	8	....	....	....	....	12	6
”	E. Market St	9	....	....	....	....	10	9
”	E. Main St	3	....	....	....	....	12	3
Zanesfield		4	....	....	....	....	14	4
Zanesville	Monroe St	6	11	1	174	1	....	....
”	Columbia	8	....	....	....	....	11	5
”	High School	9	....	....	....	....	13	9
”	Moore bldg	6	....	....	....	....	15	6
”	Lincoln	8	....	....	....	....	17	4
”	Center St	5	....	....	....	....	14	5
”	Old High	4	....	....	....	....	11	4
”	Munson	2	....	....	....	....	16	2
”	McIntire	6	....	....	....	....	10	6
”	Madison St	7	....	....	....	....	17	1
”	Stemler School	4	....	....	....	....	13	4
”	Harvey ”	6	....	....	....	....	15	6
”	Grant bldg	4	14	1	....	....	....	....
Zoar	Foltz St	2	....	....	....	....	19	2

ABSTRACT OF REPORTS

OF

DEATHS AND THEIR CAUSES

IN THE FOLLOWING

CITIES, VILLAGES AND TOWNSHIPS IN OHIO

FOR THE

Year Ending December 31, 1902.

Abstracts of the Reports of Deaths and their Causes during January, 1901.

Cities over 5,000 Population. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Akron	42,728	37	10.40	13	2	3	2	...	...	...	...	...	...	...	...	...	...	...	...	6	2	3	23	3	1	1	...	...	6	...	...	9	5	...	7
Alliance	8,974	9	12.04	...	...	3	2	...	...	...	...	...	...	...	...	...	...	1	...	1	1	...	5	...	...	...	...	...	1	...	...	1	...	...	...
Ashtabula	12,949	16	14.83	2	2	1	...	...	1	...	...	...	...	...	...	...	...	...	...	4	2	2	9	...	...	...	1	...	1	...	...	2	...	2	...
Bellaire	9,912	25	30.26	6	4	5	...	...	...	...	1	...	...	...	...	...	...	...	...	5	...	3	11	1	...	...	1	2	...	1	...	5	1	3	2
Bellefontaine	6,649	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bowling Green	5,067	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bucyrus	6,560	6	11.00	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	1	1	...	...	...	1	...	...	3	...	...	...
Cambridge	8,241	11	16.02	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	2	...	...	4	...	...	...	1	...	2	...	...	1	...	...	3
Canal Dover	5,422	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Canton	30,667	32	12.15	6	2	11	...	...	...	...	...	...	...	...	...	...	...	1	2	7	...	4	11	...	...	...	2	...	1	1	...	...	2	1	...
Chillicothe	12,976	17	15.72	3	...	2	...	...	...	...	1	...	...	...	...	...	...	...	...	4	...	3	9	...	...	...	...	1	2	1	...	4	...	2	...
Cincinnati	325,902	536	19.74	75	35	98	12	...	...	...	17	6	...	...	...	1	...	29	...	86	17	65	287	18	24	32	15	3	32	15	2	74	46	13	15
Circleville	6,991	18	30.90	1	...	2	...	...	...	...	...	...	...	...	...	...	...	2	...	3	...	2	13	1	...	...	...	1	1	1	...	5	...	...	...
Cleveland	381,768	488	15.34	87	38	67	26	...	...	...	...	1	...	...	...	2	...	15	1	58	15	34	234	15	5	12	24	5	36	19	...	80	51	17	22
Columbus	125,560	168	16.13	16	13	19	2	...	2	...	...	...	1	...	...	2	...	7	1	41	8	28	87	13	6	1	5	2	12	6	...	22	9	12	11
Conneaut	7,133	6	11.22	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	3	1	...	...	...	...	...	...	...	...	1	...	...	...
Coshocton	6,473	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
Dayton	85,333	111	15.61	17	8	14	1	...	2	...	...	...	...	...	1	3	...	2	...	21	3	14	60	6	5	2	4	3	16	1	...	20	13	3	...
Defiance	7,579	15	23.73	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	2	11	4	...	1	...	...	1	...	...	3	...	...	...
Delaware	7,940	18	27.20	...	...	5	...	...	...	...	...	...	...	...	...	...	...	1	...	3	...	1	10	2	...	...	...	...	3	...	...	5	...	...	...
East Liverpool	16,485	29	21.11	10	7	6	...	...	1	...	...	...	...	...	...	...	...	3	2	1	...	1	12	...	...	...	1	1	1	...	...	9	6	1	4
Elyria	8,791	9	12.28	1	...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	6	...	...	...	...	...	3	1	...	...	...	...	...
Findlay	17,613	17	11.59	2	1	1	...	...	...	...	...	...	...	...	...	...	...	1	...	5	...	3	9	3	1	...	...	...	1	...	...	...	1	1	1
Fostoria	7,730	9	13.97	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	3	3	...	...	...	1	...	1	1	...	...	...	2	1
Fremont	8,439	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Galion	7,282	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gallipolis	5,432	3	6.63	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	1	...	...	...	...	...	...	...	1	...	...	...
Glenville	5,588	5	10.73	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	2	1	...	...	...	...	1	...	...	...	2	...	...
Greenville	5,501	7	15.27	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	5	...	1	...	...	...	3	...	...	1	...	...	1
Hamilton	23,914	39	24.63	7	6	4	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	23	2	2	1	2	1	3	1	1	9	...	1	...
Ironton	11,868	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Kenton	6,852	4	7.00	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	3	...	...	...	...	...	1	...	...	1	...	...	...

Lancaster	8,991	13	17.85	1	1	3	1	...	...	..	...	...	..	...	...	...	..	1	..	3	...	3	5	...	...	...	...	...	2	1	...	2	1	1	...
Lima	21,723	32	18.19	2	...	6	...	...	1	..	...	...	..	...	...	...	..	1	..	9	2	7	9	2	...	...	...	...	2	...	...	5	6	2	3
Lorain	16,028	10	7.48	3	1	1	...	...	...	..	...	...	..	...	...	...	..	...	..	1	...	1	7	1	1	...	1	...	1	...	...	3	1	...	4
Mansfield	17,640	16	10.88	...	3	5	2	1	...	..	...	...	..	...	...	...	..	...	..	2	...	2	9	...	...	...	...	2	3	...	...	2	...	...	4
Marietta	13,348	25	22.49	4	3	4	1	...	...	..	...	...	..	...	...	...	..	3	..	3	...	3	12	1	1	...	...	1	1	3	...	5	5	...	1
Marion	11,862	17	17.20	...	...	3	...	...	...	..	...	...	..	3	...	...	..	...	..	2	...	2	11	...	...	...	1	...	1	...	...	...	1	...	...
Martins Ferry	7,760	12	18.55	...	...	2	2	...	...	..	...	...	..	...	...	...	..	...	..	...	...	...	6	...	1	...	...	...	1	...	...	1	...	2	1
Massillon	11,944	11	11.05	2	...	3	...	...	...	..	...	...	..	...	...	...	..	...	..	2	1	1	3	...	1	...	...	...	...	...	...	2	2	...	1
Middletown	9,215	11	14.32	2	1	...	...	...	...	..	...	...	..	...	...	...	..	...	..	1	1	...	9	2	1	1	2	...	2	1	...	...	...	1	...
Mt. Vernon	6,633	5	9.05	...	...	...	...	...	...	..	...	...	..	...	...	...	..	...	..	1	...	...	3	...	...	...	...	...	...	...	...	2	1	...	...
Nelsonville	5,421	8	17.71	...	2	...	...	...	...	..	...	...	..	...	...	...	..	...	..	2	...	...	6	...	1	...	...	...	...	...	...	3	...	...	...
Newark	18,157	28	18.51	1	3	6	1	...	...	..	...	...	..	...	1	1	..	...	..	...	...	...	16	3	4	...	...	...	1	...	...	6	2	...	1
Newburg	5,909	...	...	...	...	...	...	...	...	..	...	...	..	...	...	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
New Philadelphia	6,213	7	13.52	1	...	1	...	...	...	..	...	...	..	...	...	...	..	...	..	2	...	2	4	...	1	1	...	...	1	...	...	...	...	...	...
Niles	7,468	...	...	...	...	...	...	...	...	..	...	...	..	...	...	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Norwalk	7,074	6	10.20	...	...	...	...	...	...	..	...	...	..	...	...	...	..	...	..	2	...	2	3	...	...	...	...	...	...	1	...	2	...	...	1
Norwood	6,480	7	12.96	1	1	2	...	...	1	..	...	...	..	...	...	...	..	...	..	...	...	...	5	...	...	...	2	...	1	...	...	2	...	...	...
Painesville	5,024	5	11.94	...	...	2	...	...	...	..	...	...	..	...	...	...	..	2	..	...	...	...	2	...	1	...	...	...	...	...	...	1	...	1	...
Piqua	12,172	9	8.87	1	...	1	...	...	...	..	...	...	..	...	...	...	..	...	..	4	1	3	3	...	1	...	...	1	1	...	...	...	1	...	...
Portsmouth	17,870	31	20.82	4	...	4	...	...	...	..	...	...	..	...	...	...	..	1	..	8	2	4	15	...	...	...	...	...	4	...	...	5	...	4	4
St. Marys	5,359	...	...	...	...	...	...	...	...	..	...	...	..	...	...	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Salem	7,582	14	22.16	1	...	2	2	...	...	..	...	...	..	...	...	...	..	...	..	5	3	1	7	1	2	...	1	...	1	...	...	1	...	...	1
Sandusky	19,664	28	17.09	3	...	4	...	...	...	..	...	1	..	...	...	...	..	1	..	8	1	5	11	2	...	...	...	...	...	...	1	7	5	...	1
Sidney	5,688	10	21.09	2	1	2	...	...	1	..	...	...	..	...	...	...	..	...	..	...	...	...	8	...	2	1	1	...	...	...	...	1	...	...	...
Springfield	38,253	56	17.56	9	1	2	2	...	...	..	...	...	..	...	...	...	..	...	..	6	3	2	37	5	5	5	2	...	3	1	1	8	10	1	4
Steubenville	14,349	...	...	...	...	...	...	...	...	..	...	...	..	...	...	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tiffin	10,989	15	16.38	...	3	3	2	...	...	..	...	...	..	...	...	...	..	...	..	6	2	3	4	...	...	...	...	...	1	...	...	1	2	...	2
Toledo	131,822	162	14.75	37	18	27	10	1	...	..	3	...	..	1	...	1	..	2	2	18	4	9	85	3	6	4	6	1	15	4	...	20	25	7	13
Troy	5,881	...	...	...	...	...	...	...	...	..	...	...	..	...	...	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Urbana	6,808	9	15.86	...	...	...	...	...	...	..	...	...	..	...	...	...	..	...	..	5	...	1	4	...	1	2	...	...	1	...	...	...	...	...	...
Van Wert	6,422	7	13.08	...	...	2	...	...	1	..	...	...	..	...	...	...	..	1	..	2	...	...	2	1	...	...	...	...	...	...	...	...	...	1	2
Warren	8,529	7	9.85	2	1	1	1	...	...	..	...	...	..	...	...	...	..	...	..	1	...	1	5	1	...	...	...	...	1	...	...	1	...	...	...
Washington C. H.	5,751	6	12.52	2	1	...	...	...	...	..	...	...	..	...	...	...	..	...	..	...	...	...	5	...	...	...	1	1	1	...	...	1	1	...	...
Wellston	8,045	...	...	...	...	...	...	...	...	..	...	...	..	...	...	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wellsville	6,136	9	17.60	2	...	4	...	...	...	..	...	...	..	...	...	...	..	...	..	1	...	1	4	1	1	...	...	1	...	...	...	1	...	...	...
Wooster	6,063	25	49.48	...	...	9	5	...	...	..	...	...	..	...	1	...	..	3	..	6	1	4	10	5	2	...	...	1	1	...	...	1	...	...	...
Xenia	8,696	10	13.80	...	1	3	1	...	...	..	...	...	..	...	...	...	..	...	..	2	1	1	2	...	...	...	...	...	1	...	...	1	...	...	...
Youngstown	41,885	60	16.04	12	2	9	...	...	...	..	...	...	..	...	...	...	..	2	..	6	1	4	34	1	...	1	2	2	...	2	...	20	9	2	8
Zanesville	23,538	36	18.35	2	3	6	2	...	...	..	...	...	..	...	1	...	..	3	..	7	2	3	17	...	3	...	...	...	2	...	...	3	5	1	3
Total	1,713,500	2,342	16.34	346	164	363	80	2	10	..	22	8	1	4	4	11	..	83	8	377	73	238	1,200	100	81	65	76	29	177	61	5	365	213	81	124

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING FEBRUARY, 1901.

Cities over 5,000 Population. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Akron	42,728	42	11.80	7	3	2	...	...	...	...	...	...	...	...	...	...	...	...	...	8	1	6	24	2	...	2	2	2	8	1	...	4	8	...	8
Alliance	8,974	11	14.71	1	1	7	...	...	...	...	...	...	...	...	...	3	...	3	...	1	...	1	2	...	...	...	...	...	1	...	...	1	1	...	...
Ashtabula	12,949	13	12.05	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	10	1	...	...	...	...	2	...	...	3	...	2	...
Bellaire	9,912	26	31.48	7	5	2	...	...	...	...	1	1	...	...	...	...	...	...	...	8	...	2	16	1	...	2	...	1	1	...	...	10	...	...	2
Bellefontaine	6,649	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bowling Green	5,067	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bucyrus	6,560	6	11.00	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	...	1	...	...	...	...	...	...	2	...	...	...
Cambridge	8,241	13	18.93	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	...	3	7	...	...	...	1	...	1	...	...	2	...	...	2
Canal Dover	5,422	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Canton	30,667	25	9.78	3	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	1	3	17	3	1	...	3	...	4	1	...	1	4	...	...
Chillicothe	12,976	25	23.12	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	3	1	2	13	2	...	...	...	...	6	...	...	2	3	1	2
Cincinnati	325,902	506	18.63	66	29	74	7	...	...	...	15	3	1	1	...	4	...	14	...	89	21	54	260	14	27	37	11	2	29	13	3	62	61	13	30
Circleville	6,991	14	24.04	1	...	2	1	...	1	...	...	...	...	...	...	...	...	...	...	1	...	1	11	1	...	...	...	3	...	...	...	1	...	...	...
Cleveland	381,768	451	14.17	107	44	71	18	...	...	...	2	1	...	...	2	4	1	17	...	42	11	28	240	12	6	7	28	7	30	20	2	68	22	48	41
Columbus	125,560	114	10.90	7	7	21	...	...	1	...	...	1	...	...	...	2	...	3	1	28	4	22	55	5	4	...	1	1	15	4	...	15	6	4	8
Conneaut	7,133	9	15.14	5	3	1	1	...	...	...	...	...	...	...	...	...	...	...	...	3	...	3	5	...	...	1	...	...	2	...	...	2	...	...	...
Coshocton	6,473	2	3.70	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	1
Dayton	85,333	93	13.08	15	5	12	4	...	...	...	...	2	...	...	...	...	...	...	...	21	4	12	47	4	5	...	1	2	12	...	...	20	9	4	4
Defiance	7,579	5	7.91	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	2	...	1	...	...	...	...	...	...	...	...	...
Delaware	7,940	11	16.63	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	...	2	3	...	...	...	...	...	3	...	...	...	...	...	...
East Liverpool	16,485	28	20.38	5	5	9	...	1	2	...	2	...	...	...	...	...	...	4	...	2	...	2	14	2	1	2	...	1	2	...	...	6	...	3	1
Elyria	8,791	8	10.93	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2	...	4	1	...	...	...	...	...	...	...	2	...	1	...
Findlay	17,613	20	13.63	3	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	4	...	4	15	1	2	...	1	2	1	...	...	2	...	...	2
Fostoria	7,730	5	7.76	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	2	...	2	2	...	...	...	...	...	1	...	...	1	...	...	3
Fremont	8,439	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Galion	7,282	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gallipolis	5,432	8	17.67	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	1	1	4	...	...	...	...	...	2	...	...	2	...	...	...
Glenville	5,588	2	4.29	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...
Greenville	5,501	7	15.27	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	3	...	1	1	...	...	1	...	...	...	...	1	...
Hamilton	23,914	27	13.55	4	1	4	1	...	1	...	...	...	...	...	...	1	...	...	...	3	...	2	20	...	2	...	2	...	3	...	...	10	...	...	4
Ironton	11,868	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Kenton	6,852	9	15.76	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	3	3	...	1	...	...	...	1	...	...	1	2	1	...

Lancaster	8,991	16	21.35	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	6	2	4	9	....	....	....	....	....	2	2	...	5	....	1	....
Lima	21,723	24	13.26	1	1	8	...	...	...	..	...	...	..	...	1	...	..	1	..	7	....	7	5	1	....	....	....	....	2	....	...	2	3	1	1
Lorain	16,028	15	9.86	1	....	3	...	...	...	..	...	...	..	...	..	...	..	...	..	4	....	4	6	....	3	....	....	....	....	....	...	3	1	1	....
Mansfield	17,640	9	6.11	....	1	1	...	...	...	..	...	1	..	...	..	...	..	...	..	1	....	1	7	2	....	....	....	2	....	....	...	3	....	....	1
Marietta	13,348	25	22.49	4	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	3	....	3	14	....	1	1	....	1	4	....	...	2	6	1	3
Marion	11,862	18	18.21	2	2	4	2	...	...	..	...	...	..	2	..	...	..	...	..	5	2	3	9	1	....	....	1	....	2	....	...	2	....	....	....
Martins Ferry	7,760	15	23.20	4	....	3	...	...	1	..	1	1	..	...	..	...	..	...	..	6	....	4	5	....	....	....	....	....	1	....	...	4	....	1	1
Massillon	11,944	7	7.03	1	....	2	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	....	4	1	....	....	....	....	....	....	...	2	....	....	2
Middletown	9,215	7	9.11	2	1	1	...	...	...	..	...	...	..	...	..	1	..	...	..	2	1	1	4	....	....	1	....	....	....	....	...	2	....	....	....
Mt. Vernon	6,633	6	10.86	....	....	1	...	...	...	..	...	...	..	...	..	...	..	...	1	2	1	1	2	....	....	....	....	1	....	....	...	....	1	....	....
Nelsonville	5,421	3	6.64	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	3	....	....	....	1	....	1	....	...	....	....	....	1
Newark	18,157	23	15.20	3	1	6	1	...	...	..	1	1	..	...	..	...	..	...	..	3	1	1	10	....	....	....	....	....	3	1	...	4	....	....	....
Newburg	5,909	....	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
New Philadelphia	6,213	11	21.74	2	....	2	...	...	...	..	...	...	..	...	..	1	..	1	..	1	....	....	7	1	....	1	....	....	1	....	...	2	1	....	1
Niles	7,468	....	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Norwalk	7,074	9	15.27	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	9	....	....	....	....	1	1	....	...	7	....	....	....
Norwood	6,480	9	16.66	1	1	1	...	...	...	..	...	...	..	...	..	...	..	1	..	....	....	....	8	1	1	2	1	....	....	3	...	....	....	....	....
Painesville	5,024	10	23.88	....	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	4	....	....	2	1	1	....	....	....	....	....	...	....	....	2	....
Piqua	12,172	8	7.89	1	....	1	1	...	...	..	...	...	..	...	..	...	..	...	..	2	....	2	3	....	....	....	1	....	....	1	...	....	2	....	....
Portsmouth	17,870	27	17.89	5	1	8	...	...	...	..	...	...	..	...	..	...	..	1	..	5	1	3	14	....	1	1	....	....	6	....	...	5	....	....	3
St. Marys	5,359	....	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Salem	7,582	9	14.24	1	1	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	8	....	1	....	1	....	....	....	...	2	....	1	....
Sandusky	19,664	....	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Sidney	5,688	5	10.55	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	1	....	4	....	1	....	....	....	1	....	...	1	....	....	....
Springfield	38,253	32	10.04	7	3	2	...	...	...	..	...	...	..	1	..	...	..	...	..	2	....	2	21	4	1	....	....	1	2	....	...	7	....	....	....
Steubenville	14,349	....	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Tiffin	10,989	14	15.43	....	2	3	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	9	1	1	1	1	....	....	2	...	1	1	....	....
Toledo	131,822	147	13.38	27	17	18	6	...	...	..	3	...	..	1	..	...	..	3	..	21	6	11	76	3	9	3	2	3	13	6	...	24	20	12	12
Troy	5,881	....	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Urbana	6,808	7	12.34	....	....	3	...	...	...	..	...	...	..	1	..	...	..	1	..	2	....	1	2	....	....	....	....	....	1	....	...	....	....	....	....
Van Wert	6,422	3	5.60	....	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	2	1	....	....	....	....	....	....	...	1	....	....	1
Warren	8,529	6	8.44	....	....	1	...	...	1	..	...	...	..	...	..	...	..	...	..	....	....	....	3	....	....	....	....	....	....	....	...	1	2	....	1
Washington C. H.	5,751	11	22.96	1	1	1	...	...	...	..	...	...	..	...	..	...	..	...	..	3	....	2	4	....	1	....	....	....	1	....	...	1	....	1	2
Wellston	8,045	....	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Wellsville	6,136	8	15.65	....	....	2	...	...	...	..	...	...	..	...	..	...	..	...	..	4	....	1	2	....	....	....	....	....	2	....	...	....	....	....	....
Wooster	6,063	12	23.75	1	....	1	1	...	...	..	...	...	..	...	..	...	..	...	..	4	1	1	5	2	....	....	....	....	....	....	...	3	....	2	....
Xenia	8,696	10	13.80	....	1	2	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	6	....	2	....	....	....	....	....	...	3	1	....	....
Youngstown	44,885	45	12.03	13	5	6	1	...	...	..	...	...	..	...	..	1	..	1	..	6	2	2	27	....	....	2	1	1	4	1	...	15	3	1	3
Zanesville	23,538	30	15.29	2	4	3	1	...	...	..	...	...	..	...	..	...	..	1	..	3	....	2	21	3	1	2	....	....	2	2	...	4	3	....	3
Total	1,791,309	2,056	14.35	314	150	301	46	1	8	..	25	11	1	6	3	17	1	51	2	342	66	211	1,096	73	75	68	59	31	174	57	5	323	160	103	143

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING MARCH, 1901.

Cities over 5,000 Population. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Akron	42,728	32	8.98	6	3	8	2	...	1	..	...	...	..	1	..	...	..	...	..	3	....	3	14	....	....	....	2	3	3	....	...	4	4	3	4
Alliance	8,974	10	13.38	2	1	4	1	...	...	..	...	...	..	...	..	1	..	2	..	1	....	1	5	....	....	....	1	....	1	1	...	....	....	....	....
Ashtabula	12,949	22	20.39	9	2	1	...	...	...	..	1	...	..	...	..	...	..	...	..	4	1	3	16	....	....	....	1	....	....	....	...	7	....	1	2
Bellaire	9,912	22	26.63	4	8	3	...	...	...	..	1	...	..	...	..	...	..	1	1	8	1	4	10	....	....	....	3	....	....	....	...	7	1	....	....
Bellefontaine	6,649	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	1
Bowling Green	5,067	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Bucyrus	6,560	11	20.12	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	2	9	....	1	....	....	....	....	....	...	7	....	....	....
Cambridge	8,241	10	14.56	2	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	1	7	....	....	....	1	1	2	....	...	3	....	....	2
Canal Dover	5,422	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Canton	30,667	22	8.60	3	2	4	2	...	...	..	...	...	..	...	..	...	..	...	2	4	....	2	10	2	1	....	1	....	1	....	...	5	4	....	4
Chillicothe	12,976	37	34.22	2	1	7	...	...	2	..	...	...	..	...	..	...	..	1	..	15	1	10	11	2	1	....	1	....	2	....	...	3	3	1	3
Cincinnati	325,902	604	18.72	68	49	75	6	...	...	..	16	1	1	1	..	1	..	13	2	108	23	72	338	19	38	43	16	10	36	17	1	84	50	30	35
Circleville	6,991	9	15.49	1	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	8	....	....	....	....	....	....	3	...	2	....	....	....
Cleveland	381,768	521	16.37	126	35	57	7	4	...	1	...	1	..	...	1	1	..	10	2	79	13	44	266	16	11	9	26	14	40	14	2	63	72	22	28
Columbus	125,560	153	14.97	21	20	32	...	...	2	..	2	1	..	...	..	3	..	4	..	30	3	19	70	3	7	1	6	2	12	1	...	29	13	8	9
Conneaut	7,133	12	20.21	4	1	3	...	1	...	..	...	...	..	1	1	...	..	...	..	1	1	....	7	....	....	1	....	....	1	1	...	3	....	1	....
Coshocton	6,473	1	1.85	....	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	1
Dayton	85,333	112	15.75	14	4	7	...	...	2	..	...	2	..	...	..	...	..	...	..	20	2	14	69	8	5	2	3	2	18	6	...	19	10	6	7
Defiance	7,579	1	1.58	1	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	1	....	....	....	1	....	....	....	...	....	....	....	....
Delaware	7,940	11	16.63	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	10	....	....	1	....	....	1	....	...	1	....	....	....
East Liverpool	16,485	21	15.29	6	2	5	...	...	...	..	...	...	..	...	..	...	..	2	..	2	....	2	12	1	2	....	1	....	1	....	...	2	1	....	....
Elyria	8,791	8	10.92	1	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	1	4	....	....	....	....	1	2	1	...	....	....	1	....
Findlay	17,613	25	20.44	2	2	3	...	...	2	..	...	...	..	...	..	...	..	1	..	3	....	2	14	3	1	....	1	....	2	1	...	1	4	1	....
Fostoria	7,730	12	18.63	2	1	2	...	...	...	..	...	...	..	...	..	...	..	...	..	4	....	4	6	1	....	....	....	....	....	....	...	2	....	....	....
Fremont	8,439	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Galion	7,282	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Gallipolis	5,432	1	2.21	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	1	....	....	1	....	....	....	....	...	....	....	....	....
Glenville	5,588	6	12.89	....	....	1	1	...	...	..	...	...	..	...	..	...	..	...	..	1	1	....	3	1	....	....	....	....	....	1	...	1	....	....	....
Greenville	5,501	6	13.09	1	1	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	....	5	....	....	1	....	....	....	1	...	3	....	....	....
Hamilton	23,914	19	9.53	1	....	1	...	...	...	..	1	...	..	...	..	...	..	...	..	7	....	4	11	2	....	....	....	2	3	1	...	....	....	....	2
Ironton	11,868	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Kenton	6,852	7	12.26	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	2	4	1	....	....	....	....	....	....	...	1	1	....	....

Lancaster	8,991	15	20.77	1	1	3	...	...	...	..	1	...	..	...	..	1	..	...	..	4	....	4	7	1	....	....	....	....	1	1	...	4	....	1	1
Lima	21,723	37	20.44	3	1	4	...	...	2	..	...	...	..	...	..	...	..	1	..	7	1	6	18	2	....	1	....	....	3	....	...	6	5	3	2
Lorain	16,028	17	12.73	6	....	1	...	1	...	..	...	...	..	...	..	...	..	...	..	2	1	1	11	2	1	....	1	2	1	1	...	3	....	3	2
Mansfield	17,640	10	6.79	....	....	4	...	...	2	..	...	...	..	...	..	...	..	...	..	1	....	1	4	1	....	....	1	1	1	....	...	....	1	....	2
Marietta	13,348	8	7.19	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	3	1	1	5	....	....	1	....	....	3	1	...	....	....	....	2
Marion	11,862	24	24.28	....	....	7	1	...	1	..	...	...	..	2	..	...	..	1	..	....	....	....	14	1	....	....	....	....	1	....	...	2	2	1	2
Martins Ferry	7,760	9	13.92	2	1	....	...	...	...	..	...	...	..	...	..	...	..	...	..	4	....	4	3	....	....	....	....	2	1	....	...	....	....	1	1
Massillon	11,944	12	11.52	1	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	3	....	1	7	1	....	1	....	1	1	1	...	....	....	2	4
Middletown	9,215	12	15.63	....	1	....	...	...	...	..	...	...	..	...	..	...	..	...	..	4	....	4	8	2	1	....	....	....	3	1	...	1	....	....	....
Mt. Vernon	6,633	9	16.28	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	6	....	1	....	....	....	2	....	...	....	1	1	....
Nelsonville	5,421	8	17.71	....	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	6	....	1	....	....	....	3	....	...	1	....	1	....
Newark	18,157	24	15.85	5	....	4	...	...	...	..	1	...	..	...	1	1	..	...	..	2	1	....	15	3	2	....	1	....	3	1	...	3	2	1	2
Newburg	5,909	......	......	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
New Philadelphia	6,213	6	11.59	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	1	....	3	1	1	1	....	....	....	....	...	....	1	1	1
Niles	7,468	......	......	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Norwalk	7,074	6	10.18	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	5	....	....	....	....	....	....	....	...	5	....	1	....
Norwood	6,480	8	14.82	1	1	2	...	...	1	..	...	...	..	...	..	...	..	...	..	2	....	1	3	....	....	....	....	1	....	....	...	2	....	1	2
Painesville	5,024	11	26.28	2	....	2	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	2	5	....	....	....	1	....	1	....	...	....	....	1	1
Piqua	12,172	8	7.89	1	....	1	...	...	1	..	...	...	..	...	..	...	..	...	..	....	....	....	6	....	....	....	1	....	3	....	...	2	....	....	....
Portsmouth	17,870	20	13.43	2	2	3	...	...	...	..	...	...	..	...	..	...	..	...	..	3	....	3	13	....	....	....	....	1	....	....	...	7	....	1	1
St. Marys	5,359	......	......	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Salem	7,582	11	17.41	2	....	1	1	...	...	..	...	...	..	...	..	...	..	...	..	6	2	4	4	....	1	....	....	....	2	....	...	1	....	....	....
Sandusky	19,664	25	15.25	3	1	6	...	...	1	..	...	...	..	...	..	...	..	...	..	4	3	1	15	4	1	....	3	2	1	....	...	3	....	....	....
Sidney	5,688	8	16.88	1	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	8	....	....	....	....	....	2	....	...	3	....	....	....
Springfield	28,253	47	14.74	5	4	3	2	...	...	..	...	...	..	...	..	...	..	...	..	6	1	4	33	3	7	3	3	2	3	....	...	6	5	....	1
Steubenville	14,349	......	......	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Tiffin	10,989	9	9.92	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	1	1	6	1	....	....	....	....	3	....	...	2	....	....	....
Toledo	131,822	164	14.93	29	23	25	5	...	...	..	1	...	..	...	..	4	..	3	..	25	6	18	73	3	2	7	7	1	14	1	4	25	32	9	15
Troy	5,881	......	......	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Urbana	6,808	5	8.82	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	3	....	1	1	....	....	....	....	1	....	....	...	....	....	1	....
Van Wert	6,422	9	16.82	....	....	2	...	...	...	..	...	...	1	...	..	...	..	...	1	3	....	2	4	....	....	....	....	1	2	....	...	....	....	....	....
Warren	8,529	5	7.04	2	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	5	1	....	....	....	....	....	....	...	2	....	....	....
Washington C. H.	5,751	7	14.61	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	6	....	....	....	....	....	3	1	...	1	....	....	....
Wellston	8,015	......	......	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Wellsville	6,136	13	25.42	5	3	6	3	...	...	..	...	...	..	...	..	...	..	1	..	....	....	....	7	1	....	....	....	....	2	1	...	2	....	....	5
Wooster	6,063	17	33.65	2	....	3	...	2	...	..	...	...	..	...	1	...	..	...	..	2	....	1	12	1	2	....	....	1	4	....	...	4	....	....	....
Xenia	8,696	10	13.80	....	1	1	...	...	...	..	...	...	..	...	..	...	..	...	..	1	1	....	6	....	....	1	....	1	1	....	...	....	1	1	....
Youngstown	44,885	51	13.64	10	7	3	1	...	...	..	...	...	..	...	..	1	..	1	..	6	1	5	33	....	....	3	2	....	9	....	...	6	6	3	8
Zanesville	23,538	38	19.38	4	3	3	...	...	...	..	...	...	..	...	..	...	..	...	1	4	1	2	25	2	4	....	....	....	1	1	...	8	4	2	3
Total	1,719,973	2,358	17.61	363	181	301	32	8	17	1	24	5	2	5	4	13	..	41	9	403	67	261	1,288	89	91	77	84	52	199	58	7	346	223	109	153

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING APRIL, 1901.

Cities over 5,000 Population. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Akron	42,728	41	11.52	7	4	3	1	1	...	...	...	...	...	...	...	...	...	...	...	6	1	4	26	3	1	2	3	...	5	1	...	6	6	...	7
Alliance	8,974	13	17.39	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7	1	...	...	...	1	1	...	...	1	4	2	1
Ashtabula	12,949	32	29.66	9	1	7	...	...	1	...	1	1	...	4	...	...	...	...	...	1	...	...	21	1	...	...	...	1	8	...	...	3	...	3	...
Bellaire	9,912	13	15.74	4	2	1	...	...	...	...	...	1	...	...	...	...	...	...	...	5	...	3	6	...	...	...	...	...	...	...	...	4	...	...	...
Bellefontaine	6,649	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bowling Green	5,067	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bucyrus	6,560	6	10.98	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2	...	3	...	...	...	...	...	...	...	...	2	...	1	...
Cambridge	8,241	6	8.73	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	4	1	...	...	...	2	1	...	...	...	...	1	...
Canal Dover	5,422	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Canton	30,667	31	12.52	5	3	5	2	...	...	...	...	...	...	...	...	...	...	...	...	4	2	2	29	2	...	...	...	...	4	2	...	9	2	...	1
Chillicothe	12,976	15	13.87	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	1	1	9	2	1	...	...	...	3	...	...	2	...	1	...
Cincinnati	325,902	552	20.33	81	29	74	...	...	...	...	26	7	...	...	...	2	...	12	1	101	13	72	296	23	31	31	10	5	29	13	2	69	49	25	40
Circleville	6,991	6	10.30	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	2	4	1	1	...	...	...	1	...	...	...	...	...	1
Cleveland	381,768	481	15.12	126	36	47	7	2	...	...	...	...	...	...	...	3	1	14	1	75	22	41	248	14	8	10	32	15	31	21	1	51	70	23	41
Columbus	125,560	130	12.43	9	17	14	...	...	1	...	...	...	...	...	...	6	1	...	2	33	5	23	66	2	4	2	4	2	16	1	...	...	12	5	10
Conneaut	7,133	9	15.14	...	...	2	...	...	...	...	...	...	...	1	...	...	...	1	...	2	...	2	3	...	...	...	...	...	...	...	...	3	...	...	1
Coshocton	6,473	5	9.27	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	1	...	1	...	...	...	...	1	...	...	1
Dayton	85,333	100	14.07	14	6	7	2	...	2	...	...	...	...	...	...	...	...	...	...	32	4	17	47	5	5	1	3	1	13	3	2	10	7	7	6
Defiance	7,579	7	11.09	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	3	...	1	...	...	...	...	...	...	1	1	1	...
Delaware	7,940	3	4.53	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...
East Liverpool	16,485	13	9.46	...	...	3	...	...	...	...	...	...	...	...	...	...	...	2	...	1	...	1	4	1	...	...	1	...	1	...	...	1	1	1	...
Elyria	8,791	11	15.02	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	6	2	2	4	...	1	...	...	...	2	...	...	...	...	...	...
Findlay	17,613	21	14.31	2	...	4	...	...	...	...	...	...	1	2	...	...	...	1	...	3	1	2	13	2	4	1	...	1	...	...	...	2	1	...	4
Fostoria	7,730	9	13.97	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	2	6	...	1	...	...	...	2	2	...	...	...	...	2
Fremont	8,439	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Galion	7,282	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gallipolis	5,432	10	22.09	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	...	5	3	...	...	...	...	...	1	...	...	1	...	...	1
Glenville	5,588	7	15.04	1	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	6	2	...	...	...	...	...	...	...	4	...	...	...
Greenville	5,501	9	19.64	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	2	2	5	1	...	1	...	...	...	...	...	2	...	...	...
Hamilton	23,914	31	15.55	4	3	4	...	...	...	...	...	...	...	...	...	2	...	2	...	6	1	4	20	1	...	...	1	1	3	4	...	6	...	1	4
Ironton	11,868	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Kenton	6,852	5	8.76	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	1	2	1	...	...	...	...	...	...	...	...	1	1	...	...

Lancaster	8,991	10	13.35	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	2	6	1	...	...	...	2	1	...	...	1	1	...	...
Lima	21,723	36	19.89	5	1	2	1	...	...	...	...	...	...	...	...	...	...	...	...	8	...	7	17	1	...	...	...	2	7	2	...	4	...	9	2
Lorain	16,028	9	6.74	1	3	2	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	6	...	1	...	...	...	...	1	...	2	1	...	1
Mansfield	17,640	14	9.51	...	...	3	...	...	1	...	...	...	2	...	...	...	...	...	...	1	1	...	10	3	...	2	...	1	3	...	...	...	...	...	...
Marietta	13,348	18	16.18	1	...	4	...	...	...	...	...	...	...	...	1	...	...	3	...	2	...	2	7	...	...	...	...	1	3	1	...	2	1	4	1
Marion	11,862	12	12.14	1	1	4	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	1	4	...	...	1	1	1	...	...	...	1	2	...	1
Martins Ferry	7,760	5	7.73	2	1	1	...	...	...	...	...	...	...	...	...	...	...	1	...	2	...	2	2	...	...	...	...	...	2	...	...	...	...	...	1
Massillon	11,944	9	9.04	2	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	8	2	...	1	...	...	...	1	...	3	...	...	1
Middletown	9,215	10	13.03	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	4	1	3	5	1	2	1	...	...	...	...	...	1	...	...	...
Mt. Vernon	6,633	9	16.28	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	5	1	...	...	...	...	...	...	...	3	3	...	...
Nelsonville	5,421	2	4.42	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...
Newark	18,157	18	11.90	3	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	15	...	...	...	1	...	5	...	...	5	...	2	2
Newburg	5,909	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
New Philadelphia	6,213	11	21.25	3	1	3	1	...	...	...	...	...	...	...	...	...	...	...	...	2	...	2	5	2	...	...	...	...	...	...	...	3	1	...	1
Niles	7,468	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Norwalk	7,074	5	8.48	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	4	1	1	...	...	1	...	...	...	1	...	...	...
Norwood	6,480	10	18.52	2	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	7	...	5	1	...	...	...	...	1	...	...	...	...	...	...	1
Painesville	5,024	9	21.50	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	1	6	1	2	...	...	...	...	...	...	...	...	...	...
Piqua	12,172	9	8.87	3	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	...	1	...	1	1	...	1	...	1	1	1	...
Portsmouth	17,870	32	21.45	4	2	6	...	...	...	...	1	...	...	...	...	...	...	2	...	9	...	8	16	2	...	2	...	1	3	...	...	3	...	1	...
St. Marys	5,359	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Salem	7,582	9	14.24	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	6	...	1	2	...	2	...	...	...	...	...	...	...	...	...	...
Sandusky	19,664	30	18.31	4	1	5	...	...	1	...	...	...	...	...	...	1	...	1	...	7	...	6	13	1	...	...	3	1	5	...	...	1	1	4	1
Sidney	5,688	7	14.77	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	6	1	1	1	...	...	1	...	...	...	...	...	...
Springfield	38,253	41	12.86	4	2	3	...	...	...	...	...	...	...	...	1	1	...	...	...	8	3	5	23	1	5	3	...	1	...	1	1	4	5	2	3
Steubenville	14,349	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tiffin	10,989	9	9.92	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	4	3	...	...	...	...	1	1	...	...	...	...	1	1
Toledo	131,822	149	13.56	24	15	28	3	...	...	...	5	1	...	...	...	1	...	5	...	27	6	15	50	1	4	1	10	...	9	3	...	15	29	16	16
Troy	5,881	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Urbana	6,808	7	12.34	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	3	...	1	...	...	...	1	...	...	1	...	...	...
Van Wert	6,422	5	9.34	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	3	2	1	1	...	...	...	...	...	1	...	...	...	...	...	...
Warren	8,529	5	7.04	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	1	2	...	...	...	...	...	1	...	...	1	...	...	1
Washington C. H.	5,751	10	20.87	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	...	6	4	...	...	...	...	...	1	...	1	1	...	...	...
Wellston	8,045	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wellsville	6,136	12	23.47	4	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	5	...	1	5	...	1	...	...	...	2	...	...	...	...	1	2
Wooster	6,063	15	29.69	...	1	1	...	...	...	...	...	...	...	...	...	1	...	...	...	5	...	4	9	...	...	...	...	2	4	1	...	3	...	...	1
Xenia	8,696	10	13.80	1	3	4	...	...	...	...	...	...	...	1	...	...	...	...	1	3	2	1	3	...	...	...	...	...	...	...	...	2	...	...	...
Youngstown	44,885	56	14.97	7	5	11	1	...	...	...	...	...	1	...	...	...	...	8	...	14	2	10	25	1	...	...	1	...	8	1	...	5	4	2	3
Zanesville	23,538	45	22.94	4	4	3	...	...	...	...	...	...	...	...	...	...	...	2	...	10	1	8	31	3	...	...	...	1	6	2	...	11	1	...	2
Total	1,719,973	2,204	15.38	348	150	266	24	3	6	..	33	11	4	9	4	18	2	55	5	452	77	291	1,132	85	80	60	72	46	185	61	7	253	204	115	161

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING MAY, 1901.

Cities over 5,000 Population. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Akron	42,728	36	10.11	5	1	5	3	....	....	..	1	....	..	....	..	....	..	....	..	7	3	4	18	4	4	....	3	....	3	....	...	1	4	2	3
Alliance	8,974	14	18.72	2	....	4	....	....	1	..	....	....	..	....	..	....	..	2	..	....	....	....	9	....	....	....	....	....	4	....	...	1	1	....	....
Ashtabula	12,949	23	21.32	3	3	1	....	....	....	..	....	....	..	1	..	....	..	....	..	4	1	2	15	....	1	....	....	....	4	....	...	6	....	1	2
Bellaire	9,912	7	8.48	1	....	2	....	....	....	..	1	....	..	....	..	....	..	....	..	2	....	2	2	....	....	....	....	....	....	....	...	1	....	1	1
Bellefontaine	6,649	......	....	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Bowling Green	5,067	......	....	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Bucyrus	6,560	9	16.46	....	....	1	....	....	....	..	....	....	..	....	..	....	..	....	..	1	....	....	5	....	1	1	....	....	1	....	...	1	....	2	....
Cambridge	8,241	6	8.73	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	1	....	1	2	....	1	....	....	....	....	....	...	....	....	2	....
Canal Dover	5,422	......	....	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Canton	30,667	19	7.43	2	2	1	....	....	....	..	....	....	..	....	..	....	..	....	..	3	....	3	10	....	3	....	....	....	4	....	...	3	5	....	3
Chillicothe	12,976	17	15.72	2	....	2	...	2	....	..	....	....	..	....	..	....	..	....	..	10	4	3	5	....	....	....	....	....	3	....	...	....	....	....	....
Cincinnati	325,902	500	18.41	64	45	62	3	....	....	..	26	4	3	1	..	3	..	11	3	104	20	69	250	24	29	19	2	2	23	19	...	56	47	27	37
Circleville	6,991	9	15.45	1	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	2	....	....	5	1	1	....	....	....	....	1	...	1	2	....	....
Cleveland	381,768	522	16.41	116	39	58	8	3	...	1	1	....	..	....	2	9	..	11	..	96	20	53	266	10	6	22	29	20	38	22	2	53	74	21	32
Columbus	125,560	114	10.90	14	3	13	....	....	3	..	1	....	..	....	..	1	..	1	..	36	3	28	53	....	3	....	2	2	5	1	...	11	8	4	9
Conneaut	7,133	4	6.73	2	....	1	....	....	....	..	....	....	..	....	..	....	..	1	..	....	....	....	3	....	....	....	2	....	....	....	...	....	....	....	....
Coshocton	6,473	2	3.71	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	1	....	1	1	....	....	....	....	....	1	....	...	....	....	....	1
Dayton	85,333	106	14.91	12	5	12	3	...	3	..	2	....	..	....	1	....	..	1	..	31	6	15	52	4	12	2	2	2	13	4	...	8	5	6	9
Defiance	7,579	5	7.92	....	....	1	....	....	....	..	....	....	..	....	..	1	..	....	..	....	....	....	2	1	....	....	....	....	....	....	...	1	2	....	....
Delaware	7,940	6	9.06	....	....	1	....	....	....	..	....	....	..	....	..	....	..	....	..	1	....	1	4	1	1	....	....	....	2	....	...	....	....	....	....
East Liverpool	16,485	14	10.19	4	4	6	....	....	2	..	1	....	..	....	..	....	..	2	1	....	....	....	5	....	....	....	....	4	1	....	...	....	2	....	....
Elyria	8,791	10	13.65	2	1	....	....	....	....	..	....	....	..	....	..	....	..	....	..	4	....	2	6	....	1	....	....	....	1	1	1	2	....	....	....
Findlay	17,613	16	10.90	....	6	5	1	....	....	..	....	....	..	4	..	....	..	....	..	3	....	2	7	2	....	....	....	1	2	1	...	1	1	....	6
Fostoria	7,730	3	4.66	1	1	1	....	....	1	..	....	....	..	....	..	....	..	....	..	1	....	1	1	....	....	....	....	....	....	1	...	....	....	....	2
Fremont	8,439	......	....	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Galion	7,282	......	....	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Gallipolis	5,432	7	15.46	1	....	1	....	....	1	..	....	....	..	....	..	....	..	....	..	2	....	....	3	....	....	1	....	....	1	....	...	1	....	1	....
Glenville	5,588	3	6.44	2	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	1	....	....	2	....	....	....	....	....	....	1	...	1	....	....	2
Greenville	5,501	8	17.46	1	....	2	....	....	....	..	....	....	..	1	..	1	..	....	..	3	2	1	3	....	....	....	....	....	1	....	...	1	....	....	....
Hamilton	23,914	35	17.56	1	3	3	....	....	1	..	....	....	..	....	..	....	..	....	..	12	3	6	18	1	3	1	....	2	4	1	...	4	....	2	1
Ironton	11,868	......	....	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Kenton	6,852	8	14.01	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	4	2	2	2	....	....	....	....	....	....	....	...	1	2	....	....

Lancaster	8,991	5	6.68	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	3	....	....	....	....	....	1	1	....	1	1	....	....
Lima	21,723	36	19.89	....	....	4	....	....	....	....	....	....	....	....	2	1	....	....	....	12	2	5	18	....	2	....	....	....	5	1	....	3	....	2	1
Lorain	16,028	16	11.98	3	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	3	3	....	6	....	2	....	....	....	....	1	....	2	2	4	....
Mansfield	17,640	14	9.51	....	1	2	....	....	1	....	....	....	....	....	....	....	....	....	....	3	....	3	9	....	1	....	....	....	3	1	....	1	....	....	....
Marietta	13,348	15	13.49	4	1	3	....	....	....	....	1	....	....	....	....	....	....	1	1	3	1	2	6	1	1	....	1	....	1	....	....	2	1	2	2
Marion	11,862	16	16.29	1	1	2	1	....	1	....	....	....	....	....	....	....	....	....	....	4	....	4	7	....	....	....	....	....	....	....	....	2	....	1	....
Martins Ferry	7,760	8	12.37	1	....	2	....	....	1	....	....	....	....	1	....	....	....	....	....	3	....	....	3	....	....	....	....	1	....	....	....	2	....	....	....
Massillon	11,944	11	11.06	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	4	1	3	4	....	....	....	1	....	2	....	....	....	1	1	4
Middletown	9,215	4	5.21	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	1	1	1	....	....	....	....	....	....	1	....
Mt. Vernon	6,633	2	3.62	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	1	....	....	....	....	....	1
Nelsonville	5,421	3	6.64	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	1	....
Newark	18,157	18	11.90	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6	1	4	11	3	1	....	....	1	5	....	....	1	....	1	....
Newburg	5,909	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
New Philadelphia	6,213	4	7.73	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4	....	....	....	....	....	1	1	....	1	....	....	....
Niles	7,468	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Norwalk	7,074	8	13.57	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	2	5	....	2	....	....	1	1	....	....	1	....	....	....
Norwood	6,480	4	7.41	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....
Painesville	5,024	10	23.89	....	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	3	1	....	4	1	....	....	....	....	2	....	....	1	....	2	....
Piqua	12,172	22	21.69	2	2	1	....	....	....	....	....	....	....	....	....	....	....	1	....	3	....	2	14	1	1	....	....	1	3	3	....	3	1	3	....
Portsmouth	17,870	18	12.09	....	2	1	....	....	....	....	....	....	....	....	....	....	....	1	....	5	1	1	10	....	....	1	....	....	2	....	....	2	....	2	1
St. Marys	5,359	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Salem	7,582	6	9.50	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	1	....	....	....	....	....	1	....	....	....	1	....
Sandusky	19,664	33	20.14	7	1	7	1	....	2	....	....	....	....	....	....	....	....	....	....	4	....	3	17	2	1	....	2	1	....	....	....	8	4	1	2
Sidney	5,688	10	21.10	1	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	3	....	3	6	2	1	....	....	....	....	....	....	....	....	....	....
Springfield	38,253	37	11.73	5	1	2	....	1	....	....	....	....	....	....	....	....	....	....	....	11	3	8	17	2	4	1	1	1	3	....	....	2	6	1	5
Steubenville	14,349	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Tiffin	10,989	9	9.92	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	6	....	....	2	....	....	2	....	....	1	2	....	....
Toledo	131,822	126	11.47	23	13	18	1	....	2	....	2	1	....	1	....	1	....	1	2	20	5	11	71	....	7	3	6	1	10	5	....	17	10	7	13
Troy	5,881	9	18.36	....	1	1	....	....	....	....	....	1	....	....	....	....	....	....	....	4	1	3	3	....	1	....	....	....	2	....	....	....	....	....	....
Urbana	6,808	7	12.34	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	3	4	2	....	....	....	....	1	....	....	....	....	....	....
Van Wert	6,422	8	14.95	....	....	2	....	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	4	1	1	....	....	....	2	....	....	....	....	1	....
Warren	8,529	9	12.66	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	2	1	1	5	2	....	....	....	....	....	....	....	2	....	1	....
Washington C. H.	5,751	9	18.78	1	1	1	....	....	....	....	....	....	....	....	1	....	....	....	....	1	....	1	6	....	1	....	1	....	1	....	....	....	....	....	2
Wellston	8,045	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wellsville	6,136	6	11.73	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	4	....	2	....	....	....	....	....	....	....	....	....	....	....	1	2
Wooster	6,063	7	13.86	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4	....	2	....	....	....	2	....	....	....	....	2	....
Xenia	8,696	13	17.94	....	2	5	....	....	1	....	....	....	....	3	....	....	....	....	....	2	....	1	6	2	....	....	....	....	1	....	....	....	....	....	....
Youngstown	44,885	62	16.57	9	4	20	1	....	....	....	....	....	....	....	....	....	....	13	....	5	2	2	26	3	....	1	4	1	....	2	....	7	4	7	8
Zanesville	23,538	23	11.73	1	....	4	....	....	....	....	....	....	....	....	....	....	1	3	....	4	....	4	11	2	....	....	....	....	2	....	....	2	3	1	....
Total	1,725,851	2,091	14.54	300	144	267	24	6	23	1	36	6	3	12	6	17	1	50	7	448	86	267	1,050	73	95	55	57	41	164	68	3	215	188	112	149

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING JUNE, 1901.

Cities over 5,000 Population. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Akron	42,728	40	11.23	8	3	9	1	....	1	..	....	....	1	1	1	....	..	2	..	6	....	6	17	3	1	....	4	....	1	....	...	3	5	3	2
Alliance	8,974	12	16.05	2	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	9	1	1	1	....	....	3	....	...	1	1	2	....
Ashtabula	12,949	15	13.85	....	....	4	....	....	....	..	....	....	1	2	..	....	..	1	..	4	....	2	6	....	1	....	....	....	....	....	...	1	....	1	1
Bellaire	9,912	17	20.51	3	2	1	....	....	....	..	....	....	..	....	..	....	..	1	..	6	1	3	8	....	....	....	2	....	1	....	...	3	....	2	....
Bellefontaine	6,649	....	....	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Bowling Green	5,067	....	....	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Bucyrus	6,560	3	5.50	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	2	....	1	....	....	....	....	....	....	....	....	...	....	....	1	1
Cambridge	8,241	2	2.91	1	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	1	....	1	1	....	....	....	1	....	....	....	...	....	....	....	....
Canal Dover	5,422	....	....	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Canton	30,667	15	5.87	....	....	1	....	....	....	..	....	....	..	....	..	....	..	....	..	6	1	1	6	....	....	1	....	....	2	....	...	2	2	....	2
Chillicothe	12,976	15	13.92	....	....	2	....	2	....	..	....	....	..	....	..	....	..	....	..	10	4	3	3	....	....	....	....	....	3	....	...	....	....	....	....
Cincinnati	325,902	457	16.83	79	39	65	....	....	....	..	38	1	2	5	..	1	..	7	2	87	22	57	222	18	16	10	8	7	22	20	...	32	46	27	30
Circleville	6,991	8	13.73	....	....	1	....	....	....	..	....	....	..	....	..	....	..	1	..	1	....	....	6	1	1	....	....	....	1	....	...	1	....	....	1
Cleveland	381,768	445	13.99	119	34	50	6	10	2	..	....	....	..	....	1	4	..	13	..	63	21	34	178	11	5	8	27	16	33	15	...	39	83	26	31
Columbus	125,560	98	9.37	8	6	11	1	1	....	..	2	....	..	....	..	....	..	3	1	18	4	9	44	5	5	....	1	1	7	1	...	3	15	9	11
Conneaut	7,133	1	1.87	1	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Coshocton	6,473	9	16.70	....	....	1	....	1	....	..	....	....	..	....	..	....	..	....	..	3	....	3	5	....	....	....	....	....	1	....	...	1	....	....	1
Dayton	85,333	81	11.39	12	2	8	1	3	2	..	....	....	..	....	..	....	..	1	..	22	5	12	43	5	7	1	....	4	10	2	...	6	5	3	4
Defiance	7,579	6	9.49	....	....	1	....	....	....	..	....	....	..	....	..	....	..	....	..	1	....	1	4	1	....	....	1	1	....	1	...	....	....	....	....
Delaware	7,940	6	9.07	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	3	....	3	2	1	....	....	....	....	....	....	...	....	....	1	....
East Liverpool	16,485	21	15.29	3	5	2	....	....	....	..	....	....	..	....	..	....	..	....	..	4	1	3	11	2	....	....	1	2	1	1	...	4	....	4	1
Elyria	8,791	6	8.19	1	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	3	....	2	3	1	....	....	1	....	1	....	...	....	....	....	....
Findlay	17,613	14	9.54	....	1	1	....	....	....	..	....	....	..	....	..	....	..	1	..	3	1	2	7	1	....	....	....	1	2	....	...	1	1	2	3
Fostoria	7,730	5	7.76	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	2	....	1	2	1	....	....	....	....	1	....	...	....	....	1	3
Fremont	8,439	....	....	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Galion	7,282	....	....	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Gallipolis	5,432	4	8.84	....	....	1	....	....	....	..	....	....	..	....	..	....	..	1	..	....	....	....	2	1	....	....	....	....	1	....	...	....	....	1	2
Glenville	5,588	2	4.29	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	1	....	....	....	....	1	....	....	...	....	....	1	1
Greenville	5,501	3	6.54	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	1	....	1	2	....	....	....	....	....	1	....	...	....	....	....	....
Hamilton	23,914	28	17.67	4	1	2	....	....	....	..	....	....	..	....	..	....	..	....	..	12	2	6	11	1	....	....	....	2	1	3	...	3	1	2	5
Ironton	11,868	....	....	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Kenton	6,852	4	7.00	....	....	....	....	....	....	..	....	....	..	....	..	....	..	....	..	1	1	....	1	....	....	....	....	....	....	....	...	....	....	2	....

Lancaster	8,991	4	5.34	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	1	....	1	....	1	....	....	....	....	....	....	1	....
Lima	21,723	27	11.91	1	....	2	....	....	....	1	....	1	....	....	....	....	....	....	....	7	....	3	16	....	....	....	....	....	5	....	....	6	....	2	2
Lorain	16,028	17	12.71	6	2	2	....	1	....	....	....	....	....	....	....	....	....	1	....	2	....	....	9	....	1	....	2	2	2	....	....	1	2	2	1
Mansfield	17,640	10	6.80	1	2	3	....	....	....	....	2	....	....	....	....	....	....	1	....	2	2	....	5	....	1	....	1	....	3	....	....	....	....	....	2
Marietta	13,348	14	12.59	2	....	4	....	....	....	....	....	....	....	....	....	....	....	3	....	....	....	....	7	1	....	1	....	2	2	....	....	1	2	1	2
Marion	11,862	19	19.21	3	1	6	2	....	1	....	....	1	....	....	....	....	....	....	....	2	....	2	3	1	....	....	....	2	....	....	....	....	1	2	....
Martins Ferry	7,760	5	7.73	....	....	3	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	....
Massillon	11,944	9	9.04	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7	....	....	....	....	1	1	....	....	1	1	1	....
Middletown	9,215	14	18.23	2	....	4	....	....	....	....	....	2	....	....	....	....	....	....	....	3	....	3	7	2	....	....	1	1	2	....	....	....	....	....	....
Mt. Vernon	6,633	3	5.43	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....
Nelsonville	5,421	3	6.64	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	2	....	....	....	....	....	1	....	....	1	....	....	....
Newark	18,157	14	9.26	....	....	2	....	....	....	....	....	....	....	....	....	1	....	....	....	4	....	1	7	....	2	....	....	....	3	....	....	....	....	1	1
Newburg	5,909	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
New Philadelphia	6,213	2	3.86	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	1	....	....	....	....	....	1	....	....	....	....	....	1
Niles	7,468	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Norwalk	7,074	8	13.60	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	6	....	2	....	....	2	1	1	....	....	....	1	....
Norwood	6,480	7	12.96	2	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	3	....	....	2	....	....	....	....	2	....	....	....	....	....	1	....
Painesville	5,024	4	9.55	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	2	2	....	1	....	1	....	....	....	....	....	....	....	....	....	....
Piqua	12,172	7	6.90	2	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	2	1	1	2	1	....	....	....	....	....	....	....	1	2	....	....
Portsmouth	17,870	11	7.39	2	1	2	....	....	....	....	1	....	....	....	....	....	....	....	....	4	....	4	3	....	....	....	....	....	2	....	....	1	....	2	1
St. Marys	5,359	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Salem	7,582	8	12.66	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5	....	1	....	....	....	1	....	....	....	....	1	....
Sandusky	19,664	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sidney	5,688	6	12.65	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Springfield	38,253	33	10.34	3	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	1	2	22	1	5	1	....	3	4	3	....	1	5	3	....
Steubenville	14,349	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Tiffin	10,989	16	17.49	2	3	2	2	....	....	....	....	....	....	....	....	....	....	....	....	4	2	1	6	....	1	2	1	....	....	1	....	....	3	1	....
Toledo	131,822	118	10.74	18	8	16	1	3	2	....	1	....	....	....	....	....	....	5	....	20	2	13	53	1	3	2	2	3	8	1	....	9	17	11	16
Troy	5,881	4	8.16	....	1	1	....	....	1	....	....	....	....	....	....	....	....	....	....	1	....	1	1	....	....	....	....	....	1	....	....	....	1	....	....
Urbana	6,808	6	10.57	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	1	2	2	....	....	....	....	....	1	....	....	....	....	1	....
Van Wert	6,422	12	22.42	....	....	4	2	....	1	....	....	....	....	....	....	....	....	1	....	6	1	3	....	....	....	....	....	....	....	....	....	....	....	2	....
Warren	8,529	6	8.44	1	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	3	1	1	....	....	....	....	1	....	....	....	1	....
Washington C. H.	5,751	10	20.87	1	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	4	1	3	4	....	1	....	1	....	....	....	....	....	....	....	....
Wellston	8,045	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wellsville	6,136	1	7.82	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	2	....	....	....	....	....	....	....	....	....	....	....	....	2
Wooster	6,063	6	11.88	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	4	....	....	....	....	1	3	....	....	....	1	....	....
Xenia	8,696	17	23.46	2	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	4	....	2	4	....	....	....	1	....	1	....	....	1	5	2	....
Youngstown	44,885	36	9.62	5	2	6	....	1	....	....	....	....	....	1	....	....	....	4	....	3	3	....	19	....	....	....	1	1	3	1	....	2	1	6	6
Zanesville	23,538	24	12.23	1	2	3	....	1	....	....	....	....	....	....	....	1	....	1	....	9	3	4	11	1	2	....	....	....	4	....	....	2	....	1	....
Total	1,706,190	1,801	12.67	295	120	232	18	24	11	1	45	6	4	9	2	7	..	47	3	362	86	202	810	63	58	28	56	56	121	51	...	128	201	131	133

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING JULY, 1901.

Cities over 5,000 Popnlation. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one-year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Akron	42,728	38	10.67	15	3	13		9		1			1					1		5	3	2	12		2		1	1	4			1		3	4
Alliance	8,974	10	13.38	1	2	3		1										2		1	1		3						1				1	2	
Ashtabula	12,949	19	17.41	5		1		1												5	1	2	10					1	2	1		1		3	1
Bellaire	9,912	10	12.10	5	1															5	1		4						1	3				1	
Bellefontaine	6,649																																		
Bowling Green	5,067																																		
Bucyrus	6,560	8	14.67																	3		2	2		1									3	
Cambridge	8,241	6	8.74	1	3	3	1																3					1		1					2
Canal Dover	5,422																																		
Canton	30,667	22	8.35	3		3		1										2		3	1	2	12	1				1	4	1		2	3	1	1
Chillicothe	12,976	26	24.04	5	5	7		4				2						1		5	1	3	11	2			1	1		1			1	2	1
Cincinnati	325,902	644	23.72	137	81	135	2				89	10	2	5		1		16	2	94	23	62	266	22	33	13	18	3	21	35		22	48	93	30
Circleville	6,991	12	20.60			2					1							1		2		2	8						1						
Cleveland	381,768	613	19.27	225	66	157	3	77	3	3	6	5		4	1	3		15	1	63	25	28	236	10	11	7	47	20	32	26	2	26	85	65	34
Columbus	125,560	152	14.59	40	11	37		10			5					1		6		32	10	18	57	3	7		2		7	9		1	14	12	11
Conneaut	7,133	6	11.22	2		1												1		1		1	2							2				1	1
Coshocton	6,473	12	22.25	4		2		2												4	2	2	6							1					
Dayton	85,333	129	17.91	25	9	23	2	4	3		1	6			1			1	2	32	8	14	56	7	5	1	2	8	12	4	1	6	9	9	9
Defiance	7,579	6	9.49			2		1															4		1			2	1						
Delaware	7,940	4	6.04																	2		1	2	1											
East Liverpool	16,485	18	13.10	2	2	4		1										2		4	2	2	7				1	1	1					1	
Elyria	8,791	5	6.82																	3	2		2	1				1							
Finalay	17,613	13	8.86	1		1														2	1		7					1	3					3	1
Fostoria	7,730	7	10.88	1		4		2				1			1					1		1	2					2							2
Fremont	8,439																																		
Galion	7,282																																		
Gallipolis	5,432	4	8.84			2		1										1		1			1						1					1	2
Glenville	5,588	6	12.89	2		2		2												1			2		1					1					
Greenville	5,501	7	15.27	2		2		2															5		1				2						
Hamilton	23,914	27	17.05	6	1	4		2						1						7		5	16		2		2	1	2	3		2			2
Ironton	11,868																																		
Kenton	6,852	3	5.25																	1	1		2	1					1						

Lancaster	8,991	11	14.68	...	3	1	...	...	...	...	1	...	...	...	...	...	...	...	...	3	1	2	7	1	...	...	...	3	1	...	...	2	...	...	1
Lima	21,723	27	15.35	6	2	5	1	3	1	...	...	...	...	...	...	...	...	...	...	7	4	3	10	...	...	...	2	...	2	...	...	3	1	4	...
Lorain	16,028	18	13.46	12	1	5	...	3	...	...	...	1	...	...	...	...	...	...	...	2	1	1	6	1	...	...	...	1	1	1	...	1	2	3	5
Mansfield	17,640	16	10.88	2	...	7	...	2	1	...	...	...	...	...	...	...	...	...	...	4	...	2	5	1	1	...	...	...	2	...	...	...	...	...	2
Marietta	13,348	25	22.49	6	...	5	...	2	...	...	...	1	1	...	...	...	...	...	...	6	2	3	10	3	...	...	1	1	1	2	...	1	2	2	4
Marion	11,862	9	9.11	2	...	4	...	...	...	...	...	1	...	...	...	...	...	...	...	2	...	2	3	1	...	...	...	...	1	...	1	...	...	...	1
Martins Ferry	7,760	14	21.64	2	3	7	1	2	1	...	...	1	...	...	...	...	...	...	...	4	...	2	3	...	...	...	...	...	2	...	...	...	...	...	...
Massillon	11,944	10	10.01	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	4	3	1	1	...	1	...	...	...	...	...	...	...	2	2	2
Middletown	9,215	9	11.72	2	...	3	...	...	...	...	2	1	...	...	...	...	...	...	...	2	...	2	1	...	...	...	...	...	...	...	...	...	...	3	...
Mt. Vernon	6,633	11	19.91	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	1	2	6	...	1	...	...	...	2	...	...	...	1	1	...
Nelsonville	5,421	10	22.14	...	4	4	...	4	...	...	...	...	...	...	...	...	...	...	...	1	...	1	5	2	...	...	...	1	...	...	...	1	...	...	...
Newark	18,157	23	15.20	4	1	4	...	2	...	...	...	1	1	...	...	...	...	...	...	5	1	3	10	3	...	...	1	...	3	...	...	2	1	3	4
Newburg	5,909	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
New Philadelphia	6,213	3	5.79	1	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	1	...
Niles	7,468	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Norwalk	7,074	6	10.20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	3	3	...	...	...	...	...	2	...	...	1	...	...	...
Norwood	6,480	8	14.81	2	...	4	...	1	...	...	2	1	...	...	...	...	...	...	...	2	2	...	2	...	...	...	2	...	...	...	...	...	...	...	2
Painesville	5,024	1	2.39	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Piqua	12,172	15	14.78	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7	2	5	7	...	2	...	...	...	4	1	...	...	...	1	...
Portsmouth	17,870	31	20.82	7	2	6	...	2	...	...	...	...	...	...	...	...	...	2	...	5	3	2	18	...	2	...	2	...	4	1	...	...	...	2	3
St. Marys	5,359	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Salem	7,582	9	14.25	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	4	...	1	...	...	...	...	...	...	1	...	...	1
Sandusky	19,664	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sidney	5,688	8	16.87	3	...	4	1	1	...	...	...	...	...	...	...	...	...	...	1	1	1	...	3	...	...	...	1	1	...	1	...	...	...	...	...
Springfield	38,253	10	12.54	8	7	4	1	2	...	...	...	...	...	...	...	...	...	1	...	5	1	4	23	...	2	3	1	1	2	2	...	1	7	1	8
Steubenville	14,349	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tiffin	10,989	6	6.55	1	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	3	1	1	...	...	...	...	...	...	...	...	2	...
Toledo	131,822	168	15.30	13	14	42	2	21	1	...	9	...	...	1	...	...	...	3	2	25	8	11	62	1	2	3	2	3	12	4	...	3	15	22	...
Troy	5,881	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Urbana	6,808	1	1.76	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2
Van Wert	6,422	5	9.31	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	1	3	1	...	...	...	...	1	...	...	...	...	...	...
Warren	8,529	6	8.44	...	1	1	...	1	...	...	...	...	...	...	...	...	...	...	...	3	1	2	1	1	...	...	...	...	...	...	...	...	...	1	...
Washington C. H.	5,751	11	22.95	2	2	4	...	2	...	...	...	...	...	...	...	...	...	...	...	4	2	2	2	...	...	...	...	...	1	1	...	...	1	...	...
Wellston	8,045	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wellsville	6,136	5	9.78	...	1	2	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	1	...	1	...	...	...	...	1	2
Wooster	6,063	2	3.96	...	1	1	...	...	...	...	...	...	...	1	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Xenia	8,696	13	17.94	2	2	1	...	...	...	...	...	...	...	...	...	1	...	...	...	1	1	...	9	...	1	...	1	2	3	...	...	2	2	...	...
Youngstown	44,885	76	20.32	28	11	22	1	14	...	...	...	...	...	1	...	...	...	3	...	3	1	1	29	2	...	...	3	...	4	1	...	8	8	12	8
Zanesville	23,538	30	15.29	8	1	9	...	6	...	1	...	1	...	...	...	...	...	...	1	3	2	1	11	...	...	...	...	...	1	1	...	...	4	3	...
Total	1,700,309	2,434	17.18	625	242	557	15	190	11	4	116	33	5	13	3	6	..	59	9	385	120	204	989	67	78	27	91	57	146	103	4	87	207	265	146

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING AUGUST, 1901.

Cities over 5,000 Population. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Akron	42,728	42	11.80	8	2	8	5	...	...	...	...	...	2	...	...	...	...	1	...	5	2	3	17	2	1	...	2	...	2	1	...	...	7	5	6
Alliance	8,974	9	12.04	3	...	4	...	3	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	3	...
Ashtabula	12,949	22	20.39	4	4	6	...	5	...	...	...	...	...	...	...	...	...	1	...	2	...	1	9	1	2	...	...	...	2	...	...	...	...	5	...
Bellaire	9,912	11	13.31	4	...	3	...	1	...	...	...	...	...	...	...	...	...	...	...	4	2	1	3	...	...	...	...	...	1	1	...	...	...	1	...
Bellefontaine	6,649	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bowling Green	5,067	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bucyrus	6,560	6	11.00	...	...	2	...	1	1	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	1	...	...	...	...	2	...
Cambridge	8,241	7	10.19	...	...	2	...	...	...	...	...	1	1	...	...	...	...	...	...	2	1	...	3	...	...	...	...	...	2	...	...	1	...	...	...
Canal Dover	5,422	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Canton	30,667	30	11.74	13	1	9	...	7	1	...	...	...	...	...	...	...	...	1	...	6	3	2	12	...	...	...	1	...	4	...	...	1	3	...	1
Chillicothe	12,976	27	24.97	...	...	11	...	3	...	...	...	5	...	...	...	...	...	3	...	7	2	4	7	...	3	...	...	1	1	2	...	...	...	1	3
Cincinnati	325,902	462	14.32	90	49	86	3	...	...	...	47	5	2	3	...	1	...	13	5	74	18	52	202	16	24	12	6	4	23	21	...	24	40	43	52
Circleville	6,991	15	25.82	...	1	10	...	1	1	...	...	3	...	...	...	...	...	5	...	...	...	...	5	...	1	...	...	...	1	...	...	...	...	...	...
Cleveland	381,768	473	14.86	127	60	129	5	53	1	2	3	8	...	1	...	1	...	17	2	63	18	35	183	8	6	4	30	20	37	15	2	21	56	39	38
Columbus	125,560	130	12.72	28	13	27	...	7	4	...	3	...	...	...	...	1	...	8	1	18	1	12	64	4	11	1	3	5	8	2	1	1	11	8	11
Conneaut	7,133	5	8.41	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...	...	...	1	...	...	...	...	...	...
Coshocton	6,473	8	14.80	1	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	3	2	1	3	...	...	...	...	1	1	...	...	...	1	...	1
Dayton	85,333	101	14.20	27	8	27	1	5	3	1	...	9	...	...	...	...	...	4	3	20	7	7	40	8	7	2	3	...	11	3	1	...	5	9	5
Defiance	7,579	10	15.82	...	...	2	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7	2	1	...	...	...	...	1	...	...	...	...	1
Delaware	7,940	5	7.56	...	...	3	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	2	...	...	...	...	...	1	...	...	...	...	...	...
East Liverpool	16,485	11	8.01	5	...	3	...	...	...	...	1	...	...	...	...	...	...	2	...	...	...	...	5	...	...	...	1	1	...	...	...	1	2	...	...
Elyria	8,791	12	16.37	2	...	2	...	1	...	...	...	...	...	...	...	...	...	1	...	5	2	1	5	2	...	...	...	...	3	...	...	...	...	...	...
Findlay	17,613	14	9.54	2	...	2	...	1	...	...	1	...	...	...	...	...	...	...	...	2	1	1	7	...	...	...	1	...	2	...	...	...	1	2	1
Fostoria	7,730	5	7.76	...	1	2	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	2	...
Fremont	8,439	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Galion	7,282	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gallipolis	5,432	4	8.84	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	2	...	1	1	...	...	...	...	...	...	...	...	1	...	...	1
Glenville	5,588	3	6.44	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	2	...	...	...	1	...	...	...	...	...	...	...	...
Greenville	5,501	5	10.91	1	...	1	...	...	...	...	...	...	1	...	...	...	...	...	...	2	1	1	1	...	1	...	...	...	...	...	...	...	1	...	...
Hamilton	23,914	37	18.56	5	3	7	1	2	...	...	1	...	...	...	1	...	...	...	...	5	...	4	16	3	1	...	1	1	1	1	...	2	...	1	4
Ironton	11,868	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Kenton	6,852	5	8.75	...	...	3	...	2	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	1

Lancaster	8,991	12	16.01	2	3	4	...	1	...	..	2	...	1	...	..	...	..	...	..	...	...	...	8	...	1	...	...	...	3	4	...	...	...	...	...
Lima	21,723	44	24.31	6	3	18	1	7	2	..	...	...	..	...	..	...	..	2	2	3	1	2	19	1	4	...	1	...	7	...	...	3	...	4	3
Lorain	16,028	10	7.48	7	...	4	...	3	...	..	...	...	..	...	..	...	..	...	..	1	1	...	2	...	1	...	1	...	...	...	...	...	...	3	2
Mansfield	17,640	11	7.37	1	...	3	...	...	...	..	...	1	..	...	..	...	..	...	..	2	2	...	6	...	1	1	1	1	2	...	...	...	...	...	2
Marietta	13,348	30	26.99	6	...	11	...	2	...	..	...	2	..	...	1	...	..	6	..	4	2	1	11	1	2	...	...	...	2	2	...	2	3	1	...
Marion	11,862	15	15.17	5	2	5	...	3	1	..	...	1	..	...	..	...	..	...	..	1	...	1	4	...	...	...	...	1	3	...	...	...	1	1	...
Martins Ferry.....	7,760	8	12.37	...	...	5	...	...	1	..	1	...	..	...	..	1	..	2	..	...	...	...	3	...	...	...	...	...	1	...	...	1	...	...	...
Massillon	11,944	7	7.03	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	7	1	1	...	...	...	...	...	...	1	...	...	3
Middletown	9,215	13	16.92	2	...	3	...	2	...	..	...	...	..	...	1	...	..	...	..	3	1	2	5	2	...	1	...	...	1	...	...	1	...	2	...
Mt. Vernon........	6,633	11	19.91	...	...	3	...	1	...	..	2	...	..	...	..	...	..	...	..	2	...	2	5	1	1	...	...	...	1	...	...	...	1	...	...
Nelsonville	5,421	12	26.56	...	2	3	...	...	...	..	...	...	..	...	..	...	..	2	..	3	...	2	3	...	...	...	...	...	1	...	...	1	...	3	...
Newark	18,157	11	7.27	3	1	4	2	...	...	..	...	...	..	...	..	...	..	1	..	1	...	1	5	2	...	...	...	...	2	1	...	...	...	1	...
Newburg	5,909	...	...	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
New Philadelphia.	6,213	10	19.46	...	1	3	...	...	...	..	...	1	..	...	..	...	..	1	..	1	1	...	5	...	1	1	...	...	2	...	...	1	...	1	1
Niles	7,468	...	...	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Norwalk	7,074	2	3.40	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	1	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...
Norwood	6,480	3	5.55	1	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	2	1	...	1	...	...	...	...	1	...	...	...	...	...	...	1
Painesville	5,024	3	7.16	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	1	...	...	...	...	...	...	...	...	1	...	1	1
Piqua	12,172	11	10.85	2	1	1	...	...	...	..	...	...	..	...	..	...	..	...	1	3	...	2	6	2	...	...	...	...	1	...	...	...	...	1	...
Portsmouth	17,870	22	14.58	4	3	4	...	...	...	..	1	...	..	...	..	...	..	...	..	5	2	2	11	...	...	...	...	1	...	1	...	...	...	2	5
St. Marys..........	5,359	...	...	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Salem	7,582	8	12.66	...	1	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	8	1	...	...	2	...	2	...	...	...	...	...	...
Sandusky	19,664	...	...	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sidney	5,688	5	10.54	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	3	...	1	...	...	1	...	...	...	...	...	2	...
Springfield	38,253	32	10.04	5	2	6	2	2	...	..	...	1	..	...	..	...	..	1	..	6	3	3	15	4	1	...	1	1	4	1	...	1	4	1	4
Steubenville	14,349	...	...	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tiffin	10,989	26	28.66	8	3	9	1	5	...	..	...	1	..	...	..	...	..	...	..	3	...	3	7	...	...	1	...	2	1	...	...	...	7	...	...
Toledo	131,822	131	11.93	31	11	40	3	16	1	..	10	2	..	...	..	...	..	4	2	23	10	7	51	2	7	...	2	4	4	...	1	3	8	8	11
Troy	5,881	...	...	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Urbana	6,808	8	14.10	...	...	2	...	...	...	..	...	...	..	...	..	...	..	2	..	1	...	1	5	1	...	...	1	...	...	...	...	...	...	...	1
Van Wert..........	6,422	10	18.69	...	...	4	...	3	1	..	...	...	..	...	..	...	..	...	..	2	...	2	3	1	1	...	...	...	1	...	...	...	...	1	...
Warren	8,529	12	16.88	3	2	4	...	2	...	..	...	...	..	...	..	...	..	1	..	3	2	1	4	...	...	...	...	1	1	1	...	...	...	1	...
Washington C. H.	5,751	4	8.35	1	1	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	3	...	...	...	...	...	...	...	...	...	1	...	...
Wellston	8,015	...	...	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wellsville	6,136	7	13.69	1	...	2	...	1	...	1	...	...	..	...	..	...	..	...	..	2	...	1	3	...	...	...	...	...	2	...	...	...	...	...	2
Wooster	6,063	6	11.87	2	...	3	...	2	...	..	...	...	..	...	..	...	..	...	..	2	...	1	1	1	...	...	...	...	...	...	...	...	...	...	...
Xenia	8,696	11	15.18	2	4	1	...	...	...	..	...	...	..	...	..	...	..	...	..	5	3	2	3	...	1	...	...	1	...	...	...	1	2	...	...
Youngstown	41,885	61	16.31	13	6	19	3	5	...	..	1	...	..	...	..	...	..	4	..	2	...	2	19	2	...	1	1	...	4	2	...	1	9	12	2
Zanesville	23,538	14	7.14	3	...	2	...	1	...	..	...	1	..	...	..	...	..	...	..	2	1	1	7	...	...	...	...	...	4	2	...	...	1	2	...
Total	1,700,309	2,029	14.32	130	186	515	27	151	18	4	73	42	7	4	3	4	..	86	16	305	90	167	856	69	81	21	59	47	157	61	5	69	166	169	163

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING SEPTEMBER, 1901.

Cities over 5,000 Population. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Akron	42,728	44	12.36	12	...	8	...	2	...	1	...	...	...	...	...	...	...	4	...	4	1	1	18	2	3	1	1	3	2	1	...	1	12	2	2
Alliance	8,974	15	20.06	2	1	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	...	...	...	...	2	2	...	...	1	4	...	...
Ashtabula	12,949	6	5.56	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	...	...	...	1	...	1	...	...	...	...	1	1
Bellaire	9,912	15	18.16	5	1	2	...	1	...	...	...	...	...	...	...	...	...	1	...	8	1	3	4	...	1	...	...	1	...	...	...	2	...	1	...
Bellefontaine	6,649	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bowling Green	5,067	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bucyrus	6,560	4	7.32	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	1	1	...	1	...	...	...	...	...	...	...	...	...	...	1	...
Cambridge	8,241	13	18.93	1	...	5	3	1	...	...	...	...	...	...	1	...	...	...	...	1	...	...	7	...	1	...	...	2	3	...	...	...	...	...	...
Canal Dover	5,422	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Canton	30,667	18	7.02	5	...	3	...	2	...	...	1	...	...	...	...	...	...	...	...	6	1	5	7	...	...	1	2	...	...	...	...	1	1	1	1
Chillicothe	12,976	21	19.42	...	...	9	...	...	...	...	...	2	...	2	...	...	...	3	...	2	...	2	7	3	1	1	...	...	1	1	...	...	3	...	2
Cincinnati	325,902	355	13.07	49	20	45	2	...	...	...	24	3	...	...	...	1	...	12	...	78	20	48	168	9	23	7	7	2	23	15	...	21	40	19	33
Circleville	6,991	8	13.73	2	...	2	...	1	1	...	...	...	...	...	...	...	...	...	...	3	...	3	3	...	...	...	...	...	...	1	...	...	...	...	...
Cleveland	381,768	422	13.25	116	50	82	17	19	2	2	3	3	...	...	...	...	...	7	...	57	19	31	160	8	4	4	21	26	23	11	1	17	83	28	42
Columbus	125,560	122	11.66	19	7	18	...	...	1	...	2	6	...	...	...	1	...	5	...	24	5	12	60	3	3	1	1	3	16	6	...	3	13	7	8
Conneaut	7,133	7	11.78	2	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	1	2	...	...	...	...	...	2	...	...	...	...	2	...
Coshocton	6,473	7	12.98	3	1	2	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	5	...	...	...	...	...	...	...	...	1	...	...	...
Dayton	85,333	81	11.39	13	6	15	1	...	...	...	...	6	1	...	...	...	...	6	1	22	5	14	39	7	...	...	4	4	8	4	...	5	4	1	7
Defiance	7,579	4	6.33	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	1	2	...	1	...	...	...	1	...	...	...	...	...	2
Delaware	7,940	13	19.65	...	...	2	...	1	...	...	...	...	...	...	...	...	...	1	...	4	...	1	5	1	...	...	...	...	2	...	...	...	...	2	...
East Liverpool	16,485	9	6.55	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	1	4	...	...	...	1	...	1	1	...	1	...	...	1
Elyria	8,791	4	5.46	...	1	1	...	1	...	...	...	...	...	...	...	...	...	...	...	2	1	1	1	...	...	...	...	...	1	...	...	...	...	...	...
Findlay	17,613	16	10.90	2	2	6	...	3	...	...	...	1	...	...	...	...	...	1	...	1	...	1	7	1	1	...	...	2	1	1	...	...	1	1	...
Fostoria	7,730	6	9.32	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	4	...	3	1	...	1	...	...	...	...	...	...	...	...	...	...
Fremont	8,439	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Galion	7,282	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gallipolis	5,432	3	6.63	...	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Glenville	5,588	2	4.30	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	2	...	...	...	...	...	1
Greenville	5,501	2	4.34	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
Hamilton	23,914	24	12.04	5	...	4	1	1	...	...	...	...	...	...	...	...	...	2	...	5	...	5	12	...	...	...	...	...	3	2	...	2	3	...	...
Ironton	11,868	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Kenton	6,852	5	8.76	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	2	...	2	...	...	...	...	...	...	...	...	...	...	2	...	...

Lancaster	8,991	6	8.01	1	2	1		1															5		2			2		1					1
Lima	21,723	24	13.26	4	2	7		4										1		3	1	2	10		1		1		6					4	3
Lorain	16,028																																		
Mansfield	17,610	14	9.51	1		3	1					1						1		5	1	4	3	1			1		1				1	2	4
Marietta	13,348	25	22.38	3	7	7	2											2		3	1	1	10	1	2				1	3		1	3	2	
Marion	11,862	8	8.11	2	3	3			1									1					3		1	1			1						2
Martins Ferry	7,760	12	18.56	3	3	4					3							1		4		3	3					1				1		1	1
Massillon	11,941	11	11.06			1					1												6	2									4		
Middletown	9,215	5	6.51	1		1					1									2	1	1	1									1	1	1	
Mt. Vernon	6,633	11	19.90	1		3		1				1								1		1	3	1									2	2	
Nelsonville	5,421	8	17.71			2												2		2		2	1									1		3	
Newark	18,157	17	11.24	4		4	1	1				1	1							4		1	8		1			2	3					1	
Newburg	5,909																																		
New Philadelphia	6,213	4	7.73	1	1	3						1						2					4					1							
Niles	7,468																																		
Norwalk	7,074	4	6.79																	1		1	3	1					1		1				
Norwood	6,480	5	9.26	2																			5		2		1			2					1
Painesville	5,024	4	9.56																				3					1	1				1		
Piqua	12,172	8	7.89	1		1														1		1	5					3					1		
Portsmouth	17,870	16	10.75	3	3	3												1		3	1	1	6						1					4	
St. Marys	5,359																																		
Salem	7,582	7	11.08			1												1		1		1	5	2					2						1
Sandusky	19,664																																		
Sidney	5,688	6	12.66	1	1	3		2										1					3									1			3
Springfield	38,253	29	9.10	5	4	3	2											1		4	2	2	15	2	2	1	1			1		2	6	1	6
Steubenville	14,349																																		
Tiffin	10,989	9	9.92																	1		1	7			1			2	1		1		1	
Toledo	131,822	152	13.84	33	14	43	5	12			11	1						6	5	20	6	7	57	1	2	2	2	3	10	4		4	20	9	10
Troy	5,881																																		
Urbana	6,808	12	21.16	2		2		2												2		2	8	1		1			1						
Van Wert	6,422	12	22.43			4		1	2									1					7	1	2			1	2			1		1	2
Warren	8,529	6	8.44	1		3	1		1		1									1		1	2						1						1
Washington C. H.	5,751	4	8.33	1	1	2						2											1										1		
Wellston	8,045																																		
Wellsville	6,136	1	1.96			1																													1
Wooster	6,063	13	25.73	1		2		1												6	1	3	5	1					4						
Xenia	8,696	8	11.04			4												2					4	2		1						1			
Youngstown	44,885	64	17.11	11	7	17	1	5										5		3		3	26	1		1	1	1	4	3		2	7	9	7
Zanesville	23,538	34	17.34	2	10	19	16	1		1									1	6		6	4						2				3	2	1
Total	1,684,281	1,765	12.58	323	149	359	54	67	8	4	69	29	2	2	1	2	..	72	7	305	69	179	746	51	54	23	43	60	135	58	2	71	216	109	147

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING OCTOBER, 1901.

Cities over 5,000 Population. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Akron	42,728	29	8.15	7	3	2	...	...	1	...	...	...	...	...	...	...	...	...	...	3	2	1	17	3	2	...	1	...	3	2	...	1	5	1	9
Alliance	8,974	6	8.02	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	2	...	2	2	...	...	...	...	...	1	...	...	...	...	1	...
Ashtabula	12,949	12	11.12	2	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	3	1	1	5	...	...	...	1	...	3	...	...	...	...	3	...
Bellaire	9,912	16	19.37	4	3	3	1	...	...	...	1	...	...	...	...	1	...	...	...	3	...	1	8	...	1	1	1	...	1	...	...	3	...	1	4
Bellefontaine	6,649	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bowling Green	5,067	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bucyrus	6,560	9	16.47	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	2	4	...	...	...	...	...	1	...	...	...	...	1	1
Cambridge	8,241	13	18.93	1	...	10	6	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	3	...	...	...	...	...	1	...	...	...	...	...	...
Canal Dover	5,422	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Canton	30,667	29	11.35	9	1	6	...	...	1	...	...	...	...	...	...	...	...	...	...	3	1	2	11	2	1	...	...	...	...	...	...	3	6	3	2
Chillicothe	12,976	24	21.90	...	...	5	...	1	...	...	...	...	...	...	...	...	...	3	...	8	...	4	6	1	1	...	1	1	2	...	...	...	1	4	1
Cincinnati	325,902	437	16.09	52	37	55	11	...	...	...	21	3	2	...	...	1	...	14	2	96	12	63	230	20	39	13	9	1	17	10	...	43	31	25	33
Circleville	6,991	12	20.60	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	2	10	...	...	...	...	...	2	...	...	1	...	...	...
Cleveland	381,768	450	14.15	94	41	73	24	5	...	...	1	2	...	...	2	4	...	9	1	46	15	35	200	13	5	7	21	15	47	5	1	38	79	29	45
Columbus	125,560	121	11.30	9	7	10	2	...	...	...	...	1	...	...	...	...	...	2	...	28	6	16	66	9	5	...	1	2	12	...	...	11	10	7	6
Conneaut	7,133	11	18.46	4	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	6	...	...	...	2	1	...	1	...	...	...	1	...
Coshocton	6,473	7	12.98	...	1	4	3	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	2	1	...	...	...	...	...	...	...	...	1	...	2
Dayton	85,333	110	15.47	17	4	15	...	2	3	...	...	7	...	...	...	...	...	3	...	27	7	12	53	6	3	2	2	7	10	...	...	2	7	8	8
Defiance	7,579	7	11.09	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	3	...	1	...	...	...	1	...	...	...	3	...	...
Delaware	7,940	9	13.60	...	...	2	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	5	...	...	...	...	...	2	...	...	...	...	1	...
East Liverpool	16,485	16	11.65	1	2	6	...	...	...	...	...	...	...	...	...	...	...	3	...	2	1	1	8	...	...	...	1	...	1	...	...	1	...	...	...
Elyria	8,791	14	19.11	1	...	2	...	...	...	...	...	...	...	...	...	...	...	1	...	8	1	2	2	2	...	...	...	...	...	...	...	...	...	2	1
Findlay	17,613	21	14.31	4	1	7	2	1	...	...	...	...	...	...	...	...	...	...	...	4	...	3	6	...	...	1	1	...	3	...	...	...	1	3	4
Fostoria	7,730	4	6.21	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	2	...	...	...	...	...	2	...	...	...	...	1	1
Fremont	8,439	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Galion	7,282	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gallipolis	5,432	5	11.05	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	2	1	...	...	...	...	1	...	...	...	...	...	...	1
Glenville	5,588	2	4.30	1	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...
Greenville	5,501	7	15.27	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	1	3	3	...	...	...	...	...	2	...	...	1	...	...	...
Hamilton	23,914	31	15.55	4	3	3	...	...	...	...	1	...	...	...	...	...	...	1	...	6	1	3	21	1	...	...	1	1	6	4	...	3	...	1	...
Ironton	11,868	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Kenton	6,852	3	5.26	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...

Lancaster	8,991	12	16.02	...	1	1	...	...	...	...	1	...	...	...	...	...	...	...	...	4	1	3	6	...	...	...	...	2	2	...	...	2	1	...	...
Lima	21,723	24	13.26	5	2	9	2	3	2	...	...	1	...	...	...	...	...	...	...	5	1	2	7	...	1	...	1	1	2	...	...	...	...	3	5
Lorain	16,028	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mansfield	17,640	11	7.48	2	...	2	...	2	...	...	...	...	...	...	...	...	...	...	...	3	1	2	4	...	...	...	...	1	3	...	...	...	1	1	2
Marietta	13,348	36	32.37	5	5	6	1	...	...	...	1	...	...	...	1	...	...	3	...	6	1	4	18	2	...	...	...	1	3	...	...	7	3	3	3
Marion	11,862	19	19.22	4	...	13	...	...	2	...	...	...	...	...	...	...	...	6	...	3	...	3	...	...	...	...	...	...	...	...	...	...	...	3	3
Martins Ferry	7,760	13	20.10	2	3	5	2	...	...	...	...	...	...	...	...	...	...	...	...	2	1	1	5	...	2	...	...	...	1	...	...	2	...	1	1
Massillon	11,944	8	8.04	...	...	3	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	2	2	...	...	...	...	...	...	...	...	2	1	2
Middletown	9,215	10	13.02	...	1	2	1	...	...	...	...	1	...	...	...	...	...	...	...	3	1	2	5	1	...	...	...	2	1	1	...	...	...	...	...
Mt. Vernon	6,633	5	9.06	...	...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	...	...	...	...	...	...	...	...	1	...
Nelsonville	5,421	6	13.28	...	2	1	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	3	...	...	1	...	1	1	...	...	...	...	...	1
Newark	18,157	14	9.25	2	1	2	...	...	...	...	...	1	...	...	...	...	...	...	1	2	...	2	9	1	1	...	...	...	5	1	...	...	...	1	2
Newburg	5,909	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
New Philadelphia	6,213	7	13.52	1	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	5	1	1	...	...	1	2	...	...	...	...	1	...
Niles	7,468	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Norwalk	7,074	6	10.18	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	4	2	...	...	...	...	1	1	...	...	...	...	...	...
Norwood	6,480	1	1.85	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Painesville	5,024	2	4.78	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...
Piqua	12,172	11	10.85	1	...	5	...	1	...	...	...	...	...	...	...	...	...	4	...	1	...	1	3	...	1	...	...	1	1	...	...	...	2	...	...
Portsmouth	17,870	30	20.15	5	2	6	1	...	...	...	...	...	...	...	...	...	...	1	...	9	1	5	14	2	...	...	1	1	3	...	...	2	...	1	...
St. Marys	5,359	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Salem	7,582	9	14.24	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	8	2	1	1	...	...	3	...	...	...	...	1	...
Sandusky	19,664	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sidney	5,688	6	12.66	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	5	...	...	...	...	...	3	...	...	...	...	...	...
Springfield	38,253	29	9.10	3	6	4	2	...	...	...	...	...	...	...	...	1	...	1	...	2	1	1	16	1	3	1	1	1	3	1	...	...	6	1	1
Steubenville	14,349	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tiffin	10,989	8	8.82	...	...	2	...	...	...	...	...	...	...	...	...	...	...	2	...	3	1	2	3	2	...	...	...	...	...	...	...	...	...	...	...
Toledo	131,822	140	12.75	23	12	31	9	2	...	...	8	1	...	...	...	3	...	3	1	27	5	18	51	...	3	4	5	5	5	3	...	6	16	15	28
Troy	5,881	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Urbana	6,808	10	17.63	2	2	1	...	...	...	...	...	...	...	...	...	...	...	1	...	2	1	...	7	...	...	...	...	...	...	...	...	...	...	...	...
Van Wert	6,422	5	9.34	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	1	...	...	...	...	...	...	...	...	1	2	...
Warren	8,529	5	7.04	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	3	2	...	...	...	...	1	...	...	...	1	...	...
Washington C. H.	5,751	8	16.66	1	1	2	1	...	...	...	1	...	...	...	...	...	...	...	...	2	1	1	3	...	...	...	...	...	...	...	...	...	...	1	...
Wellston	8,045	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wellsville	6,136	5	9.78	...	...	2	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	2	...	1	...	...	...	...	...	...	...	...	1	1
Wooster	6,063	11	21.77	2	...	2	...	...	...	...	2	...	...	...	...	...	...	...	...	1	...	1	7	...	1	1	...	1	3	...	...	1	...	1	...
Xenia	8,696	12	16.56	1	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2	...	5	...	...	...	...	...	1	1	...	3	3	...	1
Youngstown	44,885	57	15.24	8	6	16	4	...	...	...	...	1	...	...	...	...	...	7	...	6	2	4	26	...	...	3	1	2	2	...	...	6	6	3	8
Zanesville	23,538	31	15.80	1	7	7	5	...	...	...	...	...	...	...	...	...	...	2	...	9	4	3	10	...	...	...	...	...	3	1	...	4	3	2	...
Total	1,634,281	1,956	13.93	281	158	337	80	17	9	..	39	19	2	...	3	12	..	75	5	357	74	218	907	76	73	35	51	50	166	30	1	140	190	136	176

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING NOVEMBER, 1901.

Cities over 5,000 Population. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Akron	42,728	36	10.10	6	3	1												1		7	3	3	20	4	2	1	1		2			4	8	1	4
Alliance	8,974	5	6.69																	1		1	2										2		
Ashtabula	12,949	15	13.90	7	1	1	1																13	1				2	3			2		1	
Bellaire	9,912	10	12.10	4	1	1					1									3			5	1								1			1
Bellefontaine	6,649																																		
Bowling Green	5,067																																		
Bucyrus	6,560	8	14.64			1												1		1		1	4						1			1		2	1
Cambridge	8,241	13	18.93			4	4													1		1	7		1	1		1	3			1		1	3
Canal Dover	5,422																																		
Canton	30,667	23	8.99	1	2	2	2													2		2	10						4			3	8	1	2
Chillicothe	12,976	17	15.72			2	1	1												4	2	2	8						3	1				3	
Cincinnati	325,902	491	15.22	50	49	58	11				16	3	1	11		3		7		86	19	58	284	19	35	24	9	7	30	14	1	17	40	23	28
Circleville	6,991	7	12.02	1		1			1											2	1		4	1											
Cleveland	381,768	404	12.71	81	31	46	20	2								1	1	3	1	51	11	36	223	11	8	7	22	9	32	10	4	55	61	23	33
Columbus	125,560	122	11.66	15	9	15	3		2									7		27	8	13	60		9	1	3	6	4	3	1	7	11	8	10
Conneaut	7,133	5	8.42		1																		2			1						1			
Coshocton	6,473	6	11.10	1		2												2		2		2	2												1
Dayton	85,333	98	13.78	17	4	15	2		3			2		1			1	3		25	8	11	43	5	7	3		5	12	1		7	15		12
Defiance	7,579	4	6.33																	3		3	1												
Delaware	7,940	11	16.63																	4		1	6			1			2					1	
East Liverpool	16,485	15	10.92			3	1									1		1		2	2		8				2	2	1		2	1		2	
Elyria	8,791	8	10.92		1	2	1											1		2		1	4	1					3						
Findlay	17,613	16	10.90	3		1			1											6	1	5	9					3				1			2
Fostoria	7,730	9	13.97	1		1					1									2	1		5						1			3		1	
Fremont	8,439																																		
Galion	7,282																																		
Gallipolis	5,432	6	13.26																	1			1						1					3	
Glenville	5,588	5	10.73																	1		1	3	1					1						1
Greenville	5,501	5	10.91																				2	1	1								2	1	
Hamilton	23,914	28	14.04	6	1	2												1		5		3	15	1	2				1	2		4		3	3
Ironton	11,868																																		
Kenton	6,852	6	10.52			1														2	1	1	2						1			1	1		2

Lancaster	8,991	14	19.39	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	1	4	8	...	2	...	...	1	4	1	...	...	1	...	...
Lima	21,723	25	13.80	2	3	8	3	...	...	...	...	1	...	...	...	...	...	...	...	3	2	1	14	1	...	...	1	3	...	...	...	3	...	...	2
Lorain	16,028	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mansfield	17,640	14	9.51	...	...	6	3	...	...	...	...	...	...	...	...	...	...	3	...	4	...	4	3	...	...	...	1	...	...	...	...	2	1	...	2
Marietta	13,348	16	14.38	...	1	4	2	...	...	...	...	...	1	...	...	...	...	...	...	4	2	2	4	1	...	...	...	...	1	1	...	1	2	2	...
Marion	11,862	10	10.12	1	1	2	1	...	...	...	...	...	...	...	...	...	...	1	...	4	1	3	1	1	...	...	...	...	...	...	...	...	...	1	1
Martins Ferry	7,760	8	12.37	2	1	3	...	...	1	...	1	...	...	...	...	...	...	1	...	3	...	...	1	...	...	...	...	...	...	...	...	...	...	1	1
Massillon	11,944	10	9.60	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	7	2	1	...	...	...	2	...	...	1	...	2	...
Middletown	9,215	7	9.11	1	...	3	...	...	...	...	1	1	...	...	...	1	...	...	...	1	1	...	3	1	...	1	...	...	1	...	...	...	...	...	...
Mt. Vernon	6,633	6	10.86	...	...	2	1	...	...	...	...	1	...	...	...	...	...	...	...	1	...	1	2	...	...	1	...	...	...	...	...	1	...	1	...
Nelsonville	5,421	8	17.71	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	2	4	1	...	...	...	...	1	...	...	1	...	2	...
Newark	18,157	19	12.55	2	3	4	1	...	...	...	...	...	...	...	...	1	...	2	...	3	2	1	11	4	...	1	...	...	3	...	...	...	...	1	...
Newburg	5,909	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
New Philadelphia	6,213	10	19.32	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	3	1	5	2	...	...	...	...	...	...	...	1	...	...	1
Niles	7,468	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Norwalk	7,074	9	15.27	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	4	5	1	1	...	...	...	2	...	...	1	...	...	...
Norwood	6,480	9	16.66	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	2	...	2	6	2	...	...	...	...	2	...	...	2	...	1	...
Painesville	5,024	8	19.12	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	1	5	...	...	...	...	...	...	...	...	1	1	...	...
Piqua	12,172	6	5.92	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	1	1	...	...	...	2	...	...	...	...	2	...
Portsmouth	17,870	12	8.06	5	2	4	...	...	...	...	...	...	...	...	...	2	...	1	...	1	1	...	6	...	1	...	...	...	2	...	...	2	...	1	1
St. Marys	5,359	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Salem	7,582	6	9.50	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	5	...	1	...	...	...	2	...	...	...	...	...	...
Sandusky	19,664	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sidney	5,688	4	8.44	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	2	1	...	...	...	...	...	1	...	...	...	1	...
Springfield	38,253	26	8.15	4	1	7	1	...	...	...	...	1	...	...	...	...	...	3	1	1	...	1	14	4	1	...	...	1	2	...	...	2	3	1	3
Steubenville	14,349	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tiffin	10,989	10	11.02	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	2	1	7	...	...	...	...	...	3	1	...	...	...	...	...
Toledo	131,822	105	9.56	11	6	22	8	...	...	...	3	...	...	1	...	...	...	5	...	13	5	5	45	...	3	2	2	4	6	1	...	5	13	11	13
Troy	5,881	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Urbana	6,808	4	7.05	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	3	...	1	...	...	...	1	...	...	1	...	...	...
Van Wert	6,422	6	11.22	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	...	1	...	...	2	...	...	...	1	...	...	...
Warren	8,529	8	11.26	1	...	2	...	...	...	...	...	...	...	...	...	...	...	1	...	2	2	...	4	1	...	...	...	...	3	...	...	...	1	...	1
Washington C. H.	5,751	4	8.33	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	2	...	...	...	...	...	1	...	...	...	...	...	1
Wellston	8,045	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wellsville	6,136	7	13.72	1	...	3	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	3	...	...	...	1	...	2	...	...	...	...	...	...
Wooster	6,063	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Xenia	8,696	5	6.90	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	1	1	1	...	...	...	1	...
Youngstown	44,885	58	15.51	7	3	16	3	...	...	...	...	1	1	1	...	...	...	6	...	5	1	4	27	1	...	3	1	...	5	1	...	5	5	3	3
Zanesville	23,538	21	10.71	1	4	6	6	...	...	...	...	...	...	...	...	...	...	...	...	7	2	5	6	...	...	...	...	1	...	...	...	2	1	1	1
Total	1,678,218	1,828	13.07	238	130	257	75	3	8	..	23	11	3	14	..	9	2	53	2	318	80	189	958	70	78	44	43	48	151	38	8	141	176	116	133

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING DECEMBER, 1901.

Cities over 5,000 Population. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Akron	42,728	40	11.24	4	1	1	...	...	...	..	...	...	..	...	..	...	..	1	..	3	2	1	27	2	1	2	1	....	8	....	...	7	4	5	4
Alliance	8,974	12	16.05	....	1	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	6	....	....	....	....	1	1	....	...	1	2	4	....
Ashtabula	12,949	16	14.83	5	1	1	...	1	...	..	...	...	..	...	..	...	..	...	..	2	....	....	11	....	1	....	....	....	2	....	...	4	....	2	....
Bellaire	9,912	14	16.96	3	2	2	1	...	...	..	1	...	..	...	..	...	..	...	..	2	....	....	10	1	....	....	....	1	1	2	...	1	....	....	1
Bellefontaine	6,649	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Bowling Green	5,067	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Bucyrus	6,560	6	10.98	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	1	3	....	....	....	....	....	1	....	...	1	....	1	....
Cambridge	8,241	13	19.37	....	....	5	3	...	...	..	...	...	..	1	..	...	..	...	..	1	1	....	6	1	....	....	....	2	2	....	...	1	....	....	....
Canal Dover	5,422	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Canton	30,667	31	12.52	2	2	....	...	...	...	..	...	...	..	...	..	...	..	...	..	8	2	6	11	....	....	....	1	2	2	1	...	3	9	3	1
Chillicothe	12,976	23	21.27	....	....	2	1	...	...	..	...	...	..	...	..	...	..	...	..	4	2	2	11	4	1	....	....	....	1	....	...	4	4	2	....
Cincinnati	325,902	611	22.53	79	81	100	9	...	...	..	24	3	1	18	..	5	..	34	..	103	20	70	309	21	34	25	10	5	27	18	...	75	65	24	42
Circleville	6,991	9	15.45	....	1	1	1	...	...	..	...	...	..	...	..	...	..	...	..	2	....	2	6	....	....	....	....	2	....	....	...	....	....	....	....
Cleveland	381,768	460	14.46	93	45	50	17	...	3	..	...	...	..	1	..	2	..	9	2	74	21	34	237	6	5	13	28	7	39	15	1	57	69	23	45
Columbus	125,560	123	11.76	17	8	8	1	...	...	..	...	...	..	...	..	3	..	1	..	23	6	13	64	3	7	2	4	4	11	5	...	13	11	16	6
Conneaut	7,133	2	3.37	....	....	1	...	...	...	..	...	...	..	...	..	...	..	1	..	....	....	....	1	....	....	....	....	....	....	....	...	1	....	....	....
Coshocton	6,473	7	12.98	1	3	3	3	...	...	..	...	...	..	...	..	...	..	...	..	1	1	....	3	....	1	....	....	....	....	....	...	....	....	....	....
Dayton	85,333	105	14.77	18	3	9	1	...	1	..	...	2	..	...	..	...	..	2	1	26	7	14	58	8	4	6	1	2	13	6	...	12	7	5	8
Defiance	7,579	3	4.75	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	2	....	....	....	....	....	....	....	...	1	....	....	....
Delaware	7,940	9	13.59	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	2	7	....	....	....	....	....	2	....	...	1	....	....	....
East Liverpool	16,485	20	14.56	3	2	5	1	...	...	..	...	1	..	...	..	...	..	3	..	3	1	2	8	....	....	....	1	....	....	1	...	3	1	2	1
Elyria	8,791	8	10.92	1	....	1	...	...	...	..	...	...	..	...	..	...	..	1	..	1	....	....	4	....	....	....	1	....	2	....	...	1	....	2	....
Findlay	17,613	13	8.86	1	....	4	2	...	...	..	...	...	..	...	..	...	..	1	..	4	....	3	3	....	....	....	....	....	1	....	...	2	1	1	4
Fostoria	7,730	3	4.66	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	1	.....	....	....	....	....	....	....	....	...	....	....	1	....
Fremont	8,439	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Galion	7,282	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Gallipolis	5,432	6	13.26	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	4	1	1	2	1	....	....	....	....	1	....	...	....	....	....	....
Glenville	5,588	3	6.44	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	2	....	1	....	....	....	....	....	...	....	....	1	1
Greenville	5,501	10	21.82	....	....	2	...	...	...	..	...	1	..	...	..	...	..	...	..	....	....	....	6	2	....	....	....	....	2	....	...	1	1	1	....
Hamilton	23,914	26	13.05	5	2	2	...	...	...	..	...	...	..	1	..	...	..	...	1	5	....	4	19	3	2	....	....	2	1	2	...	5	....	....	2
Ironton	11,868	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Kenton	6,852	13	22.77	....	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	3	....	3	7	1	....	....	....	....	3	....	...	....	....	2	....

Lancaster	8,991	15	20.04	1	2	1	...	...	...	..	...	...	..	...	..	...	..	1	..	2	....	2	8	2	....	....	....	2	2	....	...	2	3	1	1
Lima	21,723	29	16.02	5	2	4	2	...	...	..	...	...	..	...	..	...	..	1	..	8	2	6	13	....	2	....	....	....	2	....	...	7	....	4	2
Lorain	16,928	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Mansfield	17,640	9	6.12	1	....	1	...	...	...	..	...	...	..	...	..	...	..	1	..	3	2	1	3	1	....	....	....	....	2	....	...	....	....	....	....
Marietta	13,348	15	13.49	4	3	2	...	...	1	..	...	1	..	...	..	...	..	...	..	4	....	4	7	1	1	....	....	1	....	....	...	3	2	....	1
Marion	11,862	13	13.45	1	2	....	...	...	...	..	...	...	..	...	..	...	..	...	..	3	1	2	3	1	1	....	....	....	....	1	...	....	....	....	4
Martins Ferry	7,760	7	10.82	....	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	....	3	....	....	....	....	1	....	....	...	2	....	1	....
Massillon	11,944	5	5.02	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	1	....	3	....	....	....	....	....	....	....	...	....	1	....	....
Middletown	9,215	11	14.33	1	....	2	...	...	...	..	...	1	..	...	..	...	..	...	..	3	1	2	6	1	....	1	....	....	1	....	...	1	....	....	....
Mt. Vernon	6,633	6	10.86	....	....	2	1	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	1	....	....	....	....	....	....	....	...	....	....	1	....
Nelsonville	5,421	7	15.50	....	....	3	...	...	...	..	1	...	..	...	..	...	..	1	..	1	....	1	3	....	....	....	1	....	....	....	...	1	....	....	1
Newark	18,157	14	9.26	....	....	1	1	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	10	....	1	1	....	1	3	....	...	1	....	1	3
Newburg	5,909	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
New Philadelphia	6,213	5	9.73	2	....	1	1	...	...	..	...	...	..	...	..	...	..	...	..	1	1	....	2	1	....	....	....	....	1	....	...	....	1	....	....
Niles	7,468	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Norwalk	7,074	2	3.39	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	1	....	....	....	....	....	1	....	...	....	....	....	....
Norwood	6,480	12	22.23	2	....	2	...	...	...	..	...	...	..	1	..	...	..	1	..	1	1	....	9	....	1	....	....	4	2	1	...	1	....	....	2
Painesville	5,024	3	7.17	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	1	....	2	1	....	....	....	....	....	....	...	....	....	....	2
Piqua	12,172	14	13.80	1	....	3	...	...	...	..	...	...	..	...	..	...	..	2	..	3	2	1	5	....	....	....	....	....	2	....	...	2	1	2	....
Portsmouth	17,870	13	8.73	1	1	2	...	...	...	..	...	...	..	...	..	...	..	...	..	2	2	....	7	....	1	2	....	....	2	....	...	1	....	2	4
St. Marys	5,359	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Salem	7,582	9	14.24	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	4	....	....	....	....	....	3	....	...	....	....	1	....
Sandusky	19,664	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Sidney	5,688	6	12.65	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	2	....	1	....	....	....	1	....	...	....	4	....	....
Springfield	38,253	42	13.17	2	....	6	1	...	...	..	...	...	..	...	..	1	..	1	..	6	1	3	26	7	4	1	....	1	4	....	...	5	1	3	5
Steubenville	14,349	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Tiffin	10,989	7	7.72	1	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	4	2	....	....	....	....	....	....	...	1	2	....	....
Toledo	131,822	151	13.74	16	9	32	9	...	...	..	6	...	..	...	..	...	..	5	1	25	6	14	69	3	3	4	2	2	8	5	...	12	14	10	11
Troy	5,881	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Urbana	6,808	8	14.10	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	3	1	1	5	....	....	....	....	....	....	1	...	1	....	....	....
Van Wert	6,422	3	5.61	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	1	1	1	....	....	....	....	....	....	...	....	....	....	....
Warren	8,529	11	15.38	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	3	1	2	8	3	....	....	....	....	1	....	...	1	....	....	....
Washington C. H.	5,751	2	4.17	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	2	....	....	....	....	....	....	....	....	....	...	....	....	....	1
Wellston	8,045	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Wellsville	6,136	6	11.74	....	....	1	...	...	...	..	...	...	..	...	..	1	..	...	..	2	....	....	3	....	....	....	....	....	2	....	...	1	....	....	1
Wooster	6,063	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Xenia	8,696	9	12.42	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	3	....	....	1	....	....	....	....	...	2	3	....	....
Youngstown	44,885	75	20.05	12	9	19	7	...	...	..	...	...	..	1	..	1	..	5	..	8	1	5	30	....	....	1	3	1	9	4	...	7	7	8	3
Zanesville	23,538	25	12.74	2	1	11	5	...	...	..	...	...	1	...	..	...	..	2	1	....	....	....	10	1	1	....	....	2	2	....	...	2	2	1	1
Total	1,678,218	2,120	15.16	264	181	293	67	1	5	..	32	9	2	23	..	13	..	73	6	366	90	209	1,074	78	73	59	53	43	168	62	1	247	205	130	157

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING THE YEAR 1901.

Cities over 5,000 Population. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Akron	42,728	457	10.70	97	28	61	5	17	3	2	5	...	5	2	2	...	..	11	..	63	20	37	234	21	21	9	22	7	48	6	...	41	74	25	60
Alliance	8,974	123	13.71	20	5	22	3	2	...	..	...	1	..	...	..	3	..	12	..	7	2	5	80	....	1	1	23	2	18	3	...	7	....	14	2
Ashtabula	12,949	209	16.14	46	28	34	2	13	1	..	3	...	..	7	..	...	..	4	..	39	5	14	100	9	10	....	5	3	26	5	...	29	11	25	9
Bellaire	9,912	174	17.55	50	29	21	2	2	...	..	4	...	..	...	..	1	..	3	1	31	6	23	98	3	2	3	8	6	6	7	...	35	24	9	11
Bellefontaine	6,649	...	...	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bowling Green	5,067	...	...	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bucyrus	6,560	84	12.80	1	7	7	...	1	2	..	...	...	..	...	..	1	..	3	..	14	3	8	47	1	2	1	1	1	7	2	...	14	2	14	3
Cambridge	8,241	107	14.98	14	12	36	17	2	...	..	2	...	..	1	2	...	..	2	..	16	3	8	50	3	1	....	1	7	3	1	...	13	....	5	13
Canal Dover	5,422	70	12.91	7	5	7	4	...	...	..	...	...	..	...	..	1	..	2	..	4	4	....	30	....	....	....	....	1	....	....	...	1	3	5	7
Canton	30,667	297	9.68	52	16	45	6	10	2	..	1	...	..	...	..	...	..	4	4	56	12	34	137	10	6	2	10	3	30	6	...	33	49	10	18
Chillicothe	12,976	230	17.73	32	13	39	2	9	1	..	...	9	..	2	..	...	..	10	..	52	14	28	110	16	5	2	4	5	18	7	1	17	13	16	15
Cincinnati	325,902	6,155	18.89	890	543	927	69	...	...	..	359	59	15	45	..	24	..	182	17	1106	228	742	3,112	223	353	266	121	51	312	210	9	579	563	372	405
Circleville	6,991	116	16.59	11	3	28	2	1	2	..	1	...	..	...	..	...	..	8	1	38	3	13	50	5	3	....	....	6	2	8	...	9	....	....	3
Cleveland	381,768	5,730	15.01	1117	519	887	158	175	2	9	16	21	..	6	9	34	3	140	11	767	211	433	2,671	134	80	110	335	174	418	193	18	568	805	364	432
Columbus	125,560	1,551	12.35	203	121	225	9	121	15	19	13	14	5	...	7	20	1	47	6	338	67	233	746	59	40	....	33	35	123	39	2	137	131	93	107
Conneaut	7,133	90	12.62	20	14	15	1	3	...	..	...	...	..	1	1	...	1	5	..	12	1	11	36	....	....	3	4	2	8	2	...	13	1	5	1
Coshocton	6,473	67	10.35	14	3	16	7	3	...	..	1	...	..	...	..	...	..	4	..	13	4	9	35	1	2	....	2	1	5	1	...	4	3	....	10
Dayton	85,333	1,227	14.38	201	64	160	18	14	21	1	3	36	..	1	4	3	1	23	7	299	66	156	611	73	75	22	25	40	148	34	4	115	96	61	85
Defiance	7,579	75	9.90	5	3	7	...	2	...	..	...	...	..	...	..	1	..	2	..	12	....	12	50	8	6	4	2	11	6	2	...	6	5	1	7
Delaware	7,940	105	13.22	....	....	10	...	...	...	..	...	...	..	...	..	...	2	7	..	35	1	12	55	2	....	4	....	....	13	....	...	7	....	5	....
East Liverpool	16,485	187	11.34	....	37	53	3	2	4	..	3	...	..	...	..	1	1	26	3	24	7	15	80	2	2	....	....	5	11	5	3	32	15	15	8
Elyria	8,791	102	11.60	10	3	12	1	2	...	..	...	...	..	...	..	...	..	4	..	45	12	12	39	9	2	....	1	1	16	3	1	6	....	6	2
Findlay	17,613	206	11.69	23	14	37	7	2	3	..	1	1	1	6	..	...	..	6	1	47	5	29	99	15	8	1	5	13	15	2	...	7	10	13	38
Fostoria	7,730	80	10.35	10	6	13	...	3	3	..	1	2	..	...	1	...	..	...	..	26	1	18	33	4	2	....	1	2	8	4	...	7	....	8	14
Fremont	8,439	...	...	...	...	...	...	...	...	..	...	...	..	...	..	...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Galion	7,282	86	11.81	12	7	21	...	1	1	..	1	...	..	...	..	...	..	8	3	18	3	10	34	3	1	....	....	2	10	2	...	9	6	7	9
Gallipolis	5,432	57	10.49	....	....	10	...	1	5	..	1	1	..	...	..	...	..	...	..	15	2	10	16	1	1	2	....	....	4	....	...	6	9	6	2
Glenville	5,588	46	8.23	9	5	4	2	2	...	..	...	...	..	...	..	...	..	...	..	8	2	4	25	4	2	....	1	1	4	3	...	6	3	3	6
Greenville	5,501	67	12.18	11	4	7	...	2	...	..	...	...	1	1	..	1	..	...	..	15	6	9	37	2	4	3	....	....	11	1	...	9	6	2	2
Hamilton	23,914	371	15.51	60	27	56	4	7	3	..	4	...	..	2	5	4	..	7	2	68	11	49	224	15	17	2	10	10	40	22	1	44	2	21	29
Ironton	11,868	238	20.05	23	21	36	3	9	...	..	...	7	1	...	..	...	..	7	1	48	8	35	81	7	1	8	3	6	16	3	1	26	....	20	6
Kenton	6,852	73	10.65	4	....	6	...	3	...	..	...	...	..	...	..	...	..	2	..	24	6	18	26	2	1	....	....	2	8	....	...	6	10	6	3

Lancaster	8,991	128	14.24	7	9	29	2	5	10	2	3	...	1	...	..	2	..	3	..	26	3	23	61	3	4	....	2	8	13	10	...	12	9	3	4
Lima	21,723	289	13.30	48	17	81	6	12	5	..	...	1	..	...	3	2	..	10	3	66	8	43	112	12	8	2	1	5	32	....	...	8	....	30	22
Lorain	16,028	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Mansfield	17,640	148	8.39	8	7	40	6	5	5	..	2	3	2	...	.	...	..	6	..	31	9	20	68	9	4	3	5	8	23	1	...	8	4	3	21
Marietta	13,348	256	19.18	37	20	51	7	7	2	..	2	4	3	...	1	...	..	21	2	40	10	26	57	8	5	3	2	6	22	6	...	25	....	18	22
Marion	11,862	169	14.26	28	13	48	7	2	6	..	3	1	..	8	1	...	..	9	..	25	4	21	70	3	9	5	3	8	12	....	...	7	15	11	12
Martins Ferry	7,760	115	14.69	....	....	25	11	4	1	..	...	1	..	1	..	1	..	4	..	31	2	14	49	....	5	....	1	4	7	5	...	11	2	8	7
Massillon	11,941	110	9.63	6	2	12	...	...	...	..	1	...	..	...	..	...	..	2	..	16	7	6	59	11	4	2	1	2	6	2	...	11	13	9	19
Middletown	9,215	114	12.37	15	5	20	1	2	...	..	6	4	..	...	..	2	..	1	..	29	9	20	57	13	6	4	3	1	10	3	...	11	....	8	8
Mt. Vernon	6,633	80	12.06	3	6	16	3	2	1	..	1	2	..	...	2	...	..	...	..	22	5	14	26	3	2	1	....	1	6	....	...	5	9	6	1
Nelsonville	5,421	70	12.91	13	7	14	...	4	...	..	2	...	..	...	2	...	..	4	..	15	....	8	26	2	2	1	2	1	10	....	...	7	....	11	3
Newark	18,157	213	11.73	30	8	49	8	3	...	..	2	4	2	...	3	4	..	4	1	33	6	14	119	19	13	2	2	4	36	6	...	22	....	12	13
Newburg	5,909	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
New Philadelphia	6,213	70	11.27	9	4	20	4	2	2	1	1	...	..	...	..	1	..	4	..	10	5	3	36	7	4	3	....	1	9	1	...	6	1	4	2
Niles	7,468	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Norwalk	7,074	73	10.32	8	....	2	1	...	...	..	1	...	..	...	..	...	..	...	..	13	....	13	45	6	5	....	1	3	9	1	1	16	7	1	....
Norwood	6,480	85	13.12	12	10	18	...	1	3	..	5	3	..	1	..	...	..	2	..	....	....	....	39	2	5	1	3	5	3	7	...	6	8	2	5
Painesville	5,024	71	14.13	4	1	11	...	...	1	..	1	...	..	...	..	...	..	4	..	....	....	....	43	2	4	....	....	2	....	....	1	4	....	8	2
Piqua	12,172	139	11.42	18	10	15	1	3	...	..	...	...	..	...	..	...	..	6	1	31	7	22	71	6	9	....	4	5	17	8	...	11	9	11	....
Portsmouth	17,870	263	11.72	42	21	49	1	2	...	..	3	...	..	...	..	2	..	10	..	59	14	33	133	5	5	6	3	4	29	2	...	28	....	22	23
St. Marys	5,359	71	13.25	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Salem	7,582	96	12.66	2	....	7	3	1	...	..	...	...	..	...	..	...	..	2	..	9	4	5	73	9	9	2	3	5	10	4	...	6	....	5	2
Sandusky	19,664	244	12.41	41	10	43	1	9	6	..	1	2	..	...	..	2	..	4	..	52	10	19	107	16	4	1	20	14	21	....	2	27	19	13	12
Sidney	5,688	82	14.42	12	1	10	1	3	1	..	...	...	..	...	..	...	..	1	1	25	8	5	44	5	8	2	2	4	9	5	...	8	....	3	2
Springfield	38,253	450	11.76	60	32	45	14	5	...	..	...	2	..	1	1	4	..	8	1	63	19	39	262	34	40	20	10	12	30	10	2	41	63	18	42
Steubenville	14,349	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Tiffin	10,989	130	11.83	12	18	14	3	1	...	..	2	...	..	...	1	...	..	2	..	34	8	19	61	5	3	2	2	1	16	8	...	10	15	6	4
Toledo	131,822	1,713	12.99	318	160	351	62	55	6	..	62	6	3	5	6	10	..	40	15	278	76	163	661	59	66	35	48	51	125	37	5	142	288	135	214
Troy	5,881	78	13.26	5	6	18	...	3	2	..	...	2	..	1	..	1	..	1	2	24	....	22	25	2	3	....	....	6	3	....	1	2	4	3	4
Urbana	6,868	84	12.34	11	6	9	...	2	...	..	...	...	..	1	..	...	..	5	..	18	3	13	56	3	2	2	1	1	7	1	...	4	....	1	2
Van Wert	6,422	84	13.08	....	....	18	2	4	...	..	...	...	1	...	..	1	..	5	1	18	3	10	40	9	5	....	....	3	9	6	...	3	....	8	4
Warren	8,529	86	10.08	14	6	14	3	2	2	..	2	...	..	...	..	1	..	1	1	22	8	9	46	11	3	....	2	3	9	4	...	10	....	4	....
Washington C. H.	5,751	82	14.26	8	6	13	2	1	...	..	4	...	..	...	1	...	2	...	..	25	6	12	45	1	4	....	6	2	15	4	1	8	....	5	6
Wellston	8,045	......	....	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	.....	....	....	....	....	....	....	....	...	....	....	....	....
Wellsville	6,136	85	13.85	14	7	26	3	2	...	1	1	...	..	...	..	2	..	3	..	25	....	5	30	2	3	....	2	2	10	1	...	3	....	4	17
Wooster	6,063	131	21.61	4	....	17	6	4	...	..	...	...	..	1	..	1	..	4	1	29	10	19	52	6	....	....	....	7	16	....	...	17	23	10	....
Xenia	8,696	125	14.37	8	11	27	1	..	2	..	...	...	..	4	..	1	..	2	1	22	10	9	55	4	4	3	3	4	11	1	...	19	17	4	1
Youngstown	41,885	701	15.62	135	67	181	23	25	23	1	...	2	2	4	1	3	..	59	..	127	16	43	288	....	17	16	21	9	55	....	...	84	22	66	66
Zanesville	23,538	349	11.83	30	28	95	37	16	1	2	2	2	1	...	1	1	1	15	5	70	15	39	144	13	12	3	....	5	28	6	...	40	26	14	22
Total	1,739,757	25,364	11.58	1210	2038	1190	511	596	150	38	526	190	43	101	54	135	12	771	92	4528	998	2697	12002	922	925	562	770	594	1952	710	53	2408	2395	1597	1869

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING THE YEAR 1901 — Continued.

268 Villages. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Ada	2,576	31	12.03	2	1	4	...	1	...	1	...	...	1	1	...	...	...	...	...	9	1	8	15	5	1	...	...	2	3	2	...	2	2	1	5
Alger	462	1	2.16	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...
Anna	451	4	8.87	...	...	2	...	...	...	...	...	...	...	...	...	...	...	1	1	2	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Apple Creek	387	4	10.34	...	...	2	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	2	1	...	...	...	...	...	...	...	...	...	...	...
Arcadia	425	3	7.06	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	1	...	...	...	...	...	...	...	...	...	...	...	...	1
Arcanum	1,225	30	23.67	4	6	16	3	2	3	...	...	...	2	...	...	...	...	6	...	6	2	4	8	1	...	...	...	...	3	...	...	4	...	...	...
Archbold	958	4	4.18	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	2	2	...	...	...	...	...	...	...	...	1	...	...
Arlington	738	11	14.91	1	1	4	...	1	...	...	...	...	...	...	...	...	...	1	...	2	...	1	5	1	1	...	...	...	2	...	...	...	...	...	2
Ashley	700	11	15.71	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	1	2	8	1	3	1	...	...	2	1	...	...	...	...	3
Ashville	654	3	4.59	...	...	2	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...
Athens	3,066	37	12.07	5	1	6	1	...	...	1	...	...	...	...	...	...	...	...	...	10	2	5	14	4	...	...	1	...	1	2	...	3	4	3	...
Attica	694	4	5.76	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	2	...	...	...	...	...	1	...	...	1	...	...	...
Avon	500	4	8.00	...	...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	2	...	...	...	...	...	...
Bainbridge	954	9	9.43	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	8	...	1	1	...	...	1	1	...	4	...	...	1
Bakersville	200	5	25.00	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	1	1	...	...	...	1	...	...	1	...	...	...
Barberton	4,354	51	11.71	8	8	9	...	2	2	...	...	...	...	...	...	1	...	1	...	9	...	4	32	2	1	2	1	2	2	...	...	12	...	1	2
Barnesville	3,721	64	17.20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Beaverdam	477	6	12.58	1	...	2	...	1	...	...	...	...	...	...	1	...	...	...	...	2	...	1	1	...	1	...	...	...	...	...	...	...	...	1	...
Bedford	1,486	27	18.17	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	6	5	1	4	...	...	1	...	...	3	...	...	...	...	...	...
Belle Centre	962	15	15.59	...	2	1	...	...	...	...	1	...	...	...	...	...	...	...	...	2	1	1	8	...	...	1	...	2	2	1	1	...	1	3	...
Bellevue	4,101	52	12.68	2	2	8	3	1	...	...	...	...	...	...	1	1	1	...	...	18	...	12	24	1	4	1	...	...	5	...	...	8	...	2	1
Bethel	850	3	3.53	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	1	1	...	...	...	...	...	...	...	...	1	...	...	1
Bettsville	492	3	6.10	...	...	3	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Beverly	712	6	8.43	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	2	2	...	...	...	...	...	...	...	...	...	3	...
Blanchester	1,788	23	12.86	3	...	3	...	1	...	...	...	...	...	...	...	...	...	1	...	7	1	4	13	4	...	3	...	...	3	...	...	...	...	...	1
Bloomingburg	636	9	14.15	...	...	3	...	1	...	...	...	...	...	...	...	...	...	2	...	3	...	2	3	1	1	...	...	...	...	...	...	1	...	...	...
Bloomville	819	9	10.99	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	6	1	1	...	...	1	3	...	...	...	...	...	2
Bluffton	1,783	19	10.66	7	3	10	...	2	2	...	1	1	...	...	...	...	...	1	3	3	...	3	5	...	...	...	...	...	2	...	...	3	...	1	...
Bondhill	1,081	22	20.35	2	3	6	...	1	...	...	4	...	...	...	1	...	...	...	...	1	...	1	10	...	...	...	4	1	2	1	...	2	4	1	...
Bradford	1,254	9	7.18	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	7	...	...	...	...	...	1	...	...	2	...	1	1
Bradner	1,148	11	9.60	4	1	6	3	1	1	...	...	...	...	...	...	...	...	1	...	1	...	1	2	1	...	...	...	...	...	...	...	1	...	1	5
Bridgeport	3,963	59	14.89	14	8	16	3	1	1	...	...	...	...	...	...	...	...	6	1	9	2	2	30	3	3	...	2	...	7	...	...	15	...	4	7
Bryan	3,131	45	14.37	2	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	8	2	6	22	3	...	...	...	1	5	...	1	3	6	4	1

Buchtel	1,000	12	12.00	2	3	5	...	1	1	..	...	...	..	...	..	...	..	1	2	....	....	....	6	1	1	....	....	....	1	1	...	2	....	1	5
Burbank	325	5	15.38	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	4	1	....	....	1	....	1	....	...	....	....	....	....
Butler	567	6	10.58	....	....	1	...	1	...	..	...	...	..	...	..	...	..	...	..	....	....	....	5	....	2	....	....	....	3	....	...	....	....	....	....
Caldwell	927	16	17.26	....	....	1	...	1	...	..	...	...	..	...	..	...	..	...	..	2	....	2	1	....	....	....	....	....	1	....	...	....	....	....	....
Caledonia	682	9	13.20	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	4	....	4	5	....	....	....	....	....	1	....	...	3	....	....	....
Camden	905	19	20.99	....	2	4	...	...	...	..	1	...	..	...	..	...	..	3	..	4	....	4	11	4	3	2	....	1	....	....	...	1	....	....	....
Canal Fulton	1,172	26	22.10	....	....	3	...	...	...	..	...	...	..	...	..	...	..	1	..	5	....	4	11	....	....	....	....	....	3	....	...	5	7	....	....
Carey	1,816	26	14.32	4	1	5	1	1	...	..	...	...	..	...	..	1	..	1	..	2	....	2	14	....	3	....	....	1	4	1	...	3	3	2	....
Carlisle	164	1	6.10	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	1	....	....	....	....	1	....	....	...	....	....	....	1
Carrollton	1,271	12	9.14	3	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	1	1	9	3	....	....	2	....	2	....	1	....	....	1	....
Carthage	2,559	38	14.85	3	2	5	1	1	...	..	...	1	..	...	..	...	..	2	..	10	1	5	16	....	2	2	....	2	....	....	...	2	5	2	3
Cedarville	1,189	43	36.16	....	....	13	2	4	...	2	...	...	..	...	1	...	..	4	..	4	1	3	26	3	10	....	....	....	4	....	2	4	....	....	....
Celina	2,815	94	33.39	9	7	42	9	5	...	2	3	1	..	...	4	3	..	5	2	....	....	....	29	1	2	....	5	8	2	1	...	6	3	4	4
Centerburg	706	4	5.61	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	4	....	2	....	....	....	1	....	...	....	....	....	....
Chagrin Falls	1,586	2	1.26	....	....	1	1	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	1	....	....	....	....	....	....	....	...	....	....	....	....
Chesterhill	480	3	6.25	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	1	....	1	....	....	....	....	....	...	....	2	....	1
Clarksville	465	8	17.20	....	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	3	1	1	4	1	....	....	....	....	3	....	...	....	....	....	....
Clearport	200	8	40.00	1	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	1	1	5	2	....	....	....	....	....	....	...	2	....	1	2
Cleves	1,328	13	9.79	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	12	....	1	....	....	....	4	....	...	5	1	....	....
Clyde	2,515	49	19.48	....	....	5	...	...	1	..	2	1	..	...	..	...	..	...	..	9	1	4	30	2	1	1	....	....	10	3	...	5	4	1	....
Coalgrove	1,191	5	4.20	....	....	5	...	2	...	..	...	1	..	...	..	2	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	3
College Hill	1,104	13	11.78	....	....	2	...	1	...	..	...	...	..	...	..	...	..	1	..	5	....	5	8	....	....	....	....	....	3	1	...	....	....	1	1
Collinwood	3,639	42	11.51	6	4	5	...	2	1	..	1	...	..	...	..	...	..	1	..	5	....	5	12	2	....	....	2	....	4	2	...	2	....	9	3
Columbiana	1,339	6	4.56	....	2	1	1	...	...	..	...	...	..	...	..	...	..	...	..	2	....	1	3	....	1	....	....	....	1	....	...	....	....	....	4
Columbus Grove	1,935	30	15.50	....	....	2	...	...	...	..	...	...	..	...	..	1	..	1	..	2	....	2	3	....	....	....	....	1	....	1	...	1	....	....	2
Congress	198	4	20.30	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	1	1	2	....	1	....	....	....	1	....	...	....	....	....	....
Convoy	690	7	10.14	....	....	2	1	1	...	..	...	...	..	...	..	...	..	...	..	2	....	1	2	....	1	....	....	1	....	....	...	....	....	1	....
Corning	1,401	29	20.70	....	....	7	1	5	1	..	...	...	..	...	..	...	..	...	..	2	....	2	5	....	....	....	....	1	2	1	...	1	....	....	....
Covington	1,791	48	26.80	4	10	8	2	1	...	..	...	...	..	...	..	2	..	1	2	3	....	3	16	1	1	2	....	1	4	3	...	4	....	4	....
Crestline	3,282	2	.61	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	2	....
Creston	893	3	3.36	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	1	....	2	....	....	....	....	....	1	....	...	1	....	....	1
Cridersville	581	4	6.88	2	....	2	...	...	1	..	...	...	..	...	..	...	..	...	..	....	....	....	2	....	....	....	....	1	1	....	...	....	....	....	1
Crooksville	835	1	1.20	....	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Croton	414	2	4.83	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	1	1	....	....	....	....	....	....	...	....	....	....	1
Cumberland	618	4	6.47	1	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	2	1	1	....	....	....	....	....	....	...	....	1	....	....
Curleyville	400	8	20.00	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	....	3	....	2	....	....	....	1	....	...	....	....	....	1
Cuyahoga Falls	3,186	47	14.75	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	13	2	10	12	2	....	....	....	....	10	....	...	....	5	1	1
Dalton	666	13	19.52	1	....	3	...	...	...	..	...	...	..	...	..	...	..	2	1	6	2	1	4	....	1	....	1	....	1	....	...	1	....	....	2
Danville	298	2	6.71	....	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	2
Degraff	1,150	18	15.65	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	4	1	3	9	2	3	....	....	....	3	....	...	1	5	....	....
Delphos	4,517	64	14.17	....	....	16	...	2	2	2	...	1	1	...	..	1	1	2	..	8	1	4	35	2	5	....	2	4	7	....	...	7	3	2	....
Delta	1,230	11	8.91	2	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	2	....	9	....	2	2	....	....	2	....	...	2	....	....	....
Dennison	3,763	28	10.10	7	1	5	...	3	1	..	...	...	..	...	..	...	..	1	..	7	....	6	12	1	....	....	....	2	8	....	...	1	2	2	2
Deshler	1,628	2	1.23	....	....	1	1	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Dresden	1,600	10	6.25	....	....	2	...	...	...	..	1	1	..	...	..	...	..	...	..	2	....	....	1	....	1	....	....	....	....	....	...	....	5	....	....
Dunkirk	1,222	19	15.55	2	....	7	...	2	3	..	...	...	..	...	1	...	..	1	..	1	....	1	7	....	....	....	....	3	....	....	...	3	....	4	3
Dupont	370	3	8.38	....	1	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	2	....	....	....	....	....	....	....	...	2	....	....	....
East Cleveland	2,757	21	7.62	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	3	1	2	13	3	1	....	....	1	6	....	...	2	....	....	1
East Palestine	2,493	27	10.83	10	1	....	...	...	...	..	...	...	..	...	..	...	..	...	..	3	2	1	1	....	....	....	....	....	....	....	...	1	....	....	....
Edgerton	1,013	12	11.51	....	1	2	...	...	...	..	...	...	..	...	..	...	..	2	..	3	....	1	5	2	....	....	1	....	....	....	...	2	....	2	....
Edison	347	5	14.41	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	1
Edon	740	10	13.51	....	....	3	...	...	1	..	...	...	..	...	..	...	..	2	..	1	....	....	5	....	....	....	....	....	....	....	...	2	1	....	....
Eldorado	358	7	19.55	....	....	1	...	1	...	..	...	...	..	...	..	...	..	...	..	3	....	2	2	....	....	....	....	1	....	....	...	1	....	1	1

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING THE YEAR 1901 — Continued.

268 Villages. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Elida	440	5	11.36	1	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	2	....	2	2	....	1	....	....	....	....	....	....	1	....	....	....
Elmore	1,025	8	7.80	....	1	2	1	....	....	....	....	....	....	....	....	....	....	1	....	1	....	1	5	....	....	....	....	....	2	....	....	1	....	....	....
Elmwood Place	2,532	21	8.29	4	2	4	....	1	....	....	....	....	....	....	....	....	....	2	....	5	....	2	11	....	....	....	1	1	....	1	1	3	....	1	6
Enon	295	8	27.12	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	4	....	....	....	....	1	....	....	....	3	....	....	....
Fayette	886	14	15.80	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	12	....	2	....	....	....	4	....	....	....	....	1	1
Forest	1,155	11	9.52	....	....	4	1	....	....	....	....	....	....	....	....	....	....	1	....	3	....	2	4	3	....	....	....	1	....	....	....	....	....	....	....
Frankfort	717	7	9.76	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5	....	....	....	....	....	....	....	....	2	....	....	....
Franklin	2,724	50	18.36	7	5	2	....	2	....	....	....	....	....	....	....	....	....	....	....	18	1	10	25	3	4	....	3	1	5	5	....	2	4	1	2
Freeport	690	6	8.70	....	....	2	....	....	....	....	....	....	....	....	....	....	1	1	....	3	....	1	1	....	....	....	....	....	....	....	....	1	....	....	....
Frazeysburg	730	32	43.84	....	....	7	2	....	3	....	....	....	....	....	....	....	....	2	....	7	....	7	18	....	1	1	....	....	2	....	....	3	....	....	3
Geneva	2,342	31	13.23	....	....	5	....	1	....	....	....	....	....	....	....	....	....	2	....	4	1	2	17	1	....	1	1	2	4	1	....	2	....	5	....
Germantown	1,702	18	10.57	3	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	2	2	....	13	3	1	1	....	....	6	....	....	2	2	1	....
Girard	2,630	39	14.83	6	2	5	1	2	....	....	....	....	....	....	....	....	....	1	....	8	4	4	15	3	....	....	....	1	3	....	....	6	5	6	4
Glendale	1,545	17	11.00	1	4	2	1	....	....	....	....	1	....	....	....	....	....	....	....	2	1	1	7	....	....	1	....	2	....	....	....	1	....	2	2
Glouster	2,155	24	11.14	....	....	4	2	....	2	....	....	....	....	....	....	....	....	....	....	6	....	6	11	....	1	....	....	3	2	....	....	....	....	3	....
Grafton	1,098	12	10.93	1	3	3	2	....	....	....	....	....	....	....	1	....	....	....	....	3	....	3	4	....	....	....	....	....	....	2	1	1	....	2	3
Grand Rapids	549	5	9.11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	....	2	....	....	1	....	....	....	1	....	1
Granville	1,425	14	9.82	2	3	1	....	....	....	....	1	....	....	....	....	....	....	....	....	4	2	1	7	1	....	....	....	5	....	....	....	1	2	....	1
Green Camp	369	2	5.42	1	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....
Greenspring	816	6	16.26	1	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	1	1	....	4	....	....	....	....	....	3	....	....	....	....	....	....
Greenwich	849	13	15.31	....	....	3	....	....	....	....	2	....	....	....	....	....	....	....	....	1	....	....	6	2	....	....	....	2	2	....	....	....	....	2	1
Groveport	519	4	7.71	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4	....	....	....	....	....	2	....	....	....	....	....	....
Groverhill	655	4	6.11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	3	1	....	....	....	....	2	....	....	....	....	....	3
Hamden	838	6	7.16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	1	3	....	1	....	....	....	....	....	....	....	....	....	....
Hamler	574	7	12.20	3	2	3	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4	....	1	....	....	....	....	....	....	2	....	....	....
Hanging Rock	665	15	22.56	....	....	6	....	1	1	....	....	....	....	....	....	2	....	1	....	2	....	2	7	....	2	....	....	....	....	....	....	5	....	....	1
Harrod	370	4	10.81	2	1	1	....	....	....	....	....	....	....	....	....	....	....	....	1	2	....	1	1	....	....	....	....	....	1	....	....	....	....	....	....
Hartwell	1,833	18	9.82	....	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	13	2	1	1	....	1	3	....	....	1	....	1	2
Higginsport	650	18	27.69	....	3	3	....	3	....	....	....	....	....	....	....	....	....	....	....	5	....	5	10	3	2	....	....	1	4	....	....	....	....	....	....
Hillsboro	4,535	64	14.11	....	....	9	1	2	1	....	....	....	....	1	....	....	....	2	....	14	1	13	11	1	4	....	....	....	3	....	....	3	....	2	....
Hollansburg	275	5	18.18	....	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	1	....	1	3	....	....	....	....	1	1	....	....	1	....	....	....
Holmesville	304	11	36.18	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	2	5	2	....	....	....	....	2	....	....	....	1	....	....
Hopedale	365	17	46.58	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	9	1	1	....	1	1	1	....	....	1	....	2	5

Hudson	983	1	1.02			1																													
Huron	1,708	2	1.17																		2		2													
Hyde Park	1,691	6	3.55			2													1					3	2					1				1		2
Ithaca	113	8	70.80			3										1			2		1	1		4									4			
Jackson	4,672	63	13.18	4	3	12	3	5	1		1				1			1						21		6		3	3	5	1	3			1	2
Jackson Center	644	6	9.32	1																	3		3	1									1		1	
Jenera	237	3	12.61			1			1															2												
Jerry City	555	5	9.01			1						1										3		3	1									1			
Jewett	743	4	5.38																			1			3									1			
Junction City	443	4	9.03																			1			2	1					1					1	1
Kelleys Island	1,174	14	11.93	2	1	1						1								6			4				1	1						3	
Kent	4,541	46	10.19	3		2	1	1												7	2	4	12	2		1		3	4	1		1		7	5
Kimbolton	245	3	12.24			1								1						2		2	1						1						
Kirby	187	3	6.04			1													1		2	1														
Lakeside	300	2	6.67																						2						1						2
Lakewood	3,355	20	5.96	2	2	2					1		1								2		2	15	1	1	1	1	2	2		1	3		1	
Larue	997	22	22.07	1	1	4								1			1		2		7		4	9		2			1	4			2		1	1
Latty	441	1	2.27																					1									1			1
Laura	378	9	23.81		2															2		2	6		1					1		2		1	2
Lebanon	2,867	44	15.35	8		2		1							1						13	3	10	9	1		1		1	3	2		1		1	5
Lexington	448	3	6.70																	3	1	1													
Lockland	2,695	33	12.21			3	1		1									1		6	1	5	19	2	1	1		5	3	3		2	5		
Lodi	816	10	11.82																	2		2	8		1				3			1			2
Loudonville	1,581	9	5.69			3													1	1	2		2	1										2	1	
Louisville	1,374	28	20.38	1	3	9		2												5	2	3	13	4				1	4			2			1
Lower Salem	190	1	5.26																	1		1													
McArthur	941	9	9.56		1															4	1	1	5	1								1			4
McComb	1,195	23	19.25			1										1				11	1	4	5									5			
McConnelsville	1,825	28	15.29			2													2					1									1			1
Madison	768	31	40.36			1														6	4	1	18				1		3			3			
Madisonville	3,140	34	10.83	4	2	12	1	2		1						1		3		10	5	3	12	1	1	1	2		5			2			
Malinta	357	1	2.80			1	1																											
Marblehead	997	4	4.01																	2	1	1	1					1					1		1
Maumee	1,856	17	9.16	1																1	1		6	1	1				3			1			
Mechanicsburg	1,617	15	9.28			3													2					12	2	3				4			3			5
Medina	2,232	23	10.80																	4	3													1	
Melrose	383	3	7.83	1		1		1															1					1				1		
Mentor	621	9	14.42	2	1	1														2			2									2	2	2	1
Miamisburg	3,941	74	18.78	1	3	10	2	1				3				1		2		17	3	9	39	2	5	3		4	13	1		2	5	3	4
Middleport	2,799	42	15.01	4	4	7		1				1				1		1	1	18	1	7	13	3		1	1		8					4	
Milford	1,149	12	10.44			1													1				8	2	1							3	1		2
Milford Center	682	9	13.20			1													1		3	1	2	1				1		2			1		1	
Millersburg	1,998	25	12.51	5	3	1								1						11		5	11	2						3		1			1
Mineral City	1,220	2	1.64			2																													
Mineral Ridge	831	17	20.46			3	1						1					1		5	2	2	9	1					6			2			10
Minerva	1,200	18	15.00		1	3		1							1				1					7	3	2				2						
Mingo Junction	2,954	28	9.48	3	4	6											1		3		3	1	1	15					4	2	1		8		4	2
Morristown	350	6	17.14																	3	2	1	3	1					2						
Morrow	869	31	35.67	3	3	4													2	2	8	1	2	14	1	3	1	1		1	1				2	1
Moscow	475	11	23.16	1	2															2	2		7	3			1					2			
Mt. Healthy	1,354	35	25.85			2	1													7	1	6	20	2					2	5		6	3	3	
Mt. Pleasant	626	61	97.38	5		10	2	1		1	1							2	1	12	4	8	26		2		1		7	1		11	2	11	7
Mt. Sterling	986	10	10.14	5	3	5		1				2		1										3		1								2		1	1

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING THE YEAR 1901 — Continued.

268 Villages. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Mt. Washington...	781	8	10.24	1	....	3	...	1	...	..	...	1	..	...	..	...	..	1	..	3	2	1	2	....	1	....	....	....	1	....	...	....	....	....	....
Mt. Cory..........	312	4	12.82	1	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	4	....	....	....	....	....	....	....	...	....	....	....	....
Murray City.......	1,118	16	14.31	3	2	7	2	1	...	..	...	...	..	...	..	3	..	1	..	1	....	1	2	....	....	....	....	1	....	....	...	1	....	1	5
Napoleon	3,639	29	7.97	5	....	4	...	...	...	..	...	...	..	...	1	1	..	1	..	4	....	3	18	1	....	1	....	1	6	....	...	3	1	2	....
Navarre	963	5	5.19	1	....	2	...	1	1	..	...	...	..	...	..	...	..	...	..	....	....	....	1	....	....	....	....	....	....	....	...	....	2	....	....
New Bremen.......	1,318	16	12.14	1	1	3	...	...	...	..	...	...	..	...	..	...	1	...	..	5	....	3	8	1	1	2	....	....	....	....	...	1	....	....	1
Newcomerstown ..	2,659	40	15.04	11	1	10	...	2	2	..	...	...	..	1	..	1	..	1	..	4	1	3	20	1	1	....	....	1	2	1	...	2	....	6	1
New Concord......	675	10	14.81	....	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	8	1	....	....	....	....	5	....	...	2	1	....	....
New Lexington...	265	3	11.32	....	....	1	...	...	...	..	...	...	..	...	..	1	..	...	..	2	1	1	....	....	....	....	....	....	....	....	...	....	....	....	....
New London......	1,180	25	21.19	....	....	2	1	...	...	..	...	1	..	...	..	...	..	...	..	5	1	4	15	....	1	....	1	....	5	....	...	2	1	2	1
New Richmond....	1,916	29	15.14	2	3	14	...	3	...	..	...	...	..	...	..	...	..	4	..	8	1	6	9	3	....	....	....	....	3	....	...	3	....	....	2
New Riegel........	298	5	16.78	....	....	2	...	...	...	..	...	...	..	...	..	...	..	1	..	2	....	2	1	....	....	....	....	....	....	....	...	....	....	....	....
New Washington..	824	8	9.71	....	....	1	...	...	...	..	...	...	..	...	..	...	..	1	..	1	1	....	5	1	1	....	1	....	1	....	...	....	....	1	....
New Waterford....	700	1	1.43	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	1	....	....	....	....	....	....	....	....	....	...	....	....	....	....
North Baltimore...	3,561	30	8.42	2	5	4	1	...	...	..	...	1	..	...	..	...	..	1	..	6	....	4	17	3	1	....	....	1	4	....	...	5	....	3	1
North Lewisburg..	846	11	13.00	....	....	2	...	...	...	..	...	...	..	...	..	...	..	...	..	1	1	....	6	....	1	....	....	....	2	....	...	1	....	1	1
North Robinson...	200	4	20.00	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	1	2	....	....	....	....	....	....	....	...	1	....	....	2
Oak Harbor.......	1,631	12	7.36	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....	....
Oak Hill...........	825	8	9.64	....	3	2	...	...	...	..	...	...	..	...	..	...	..	2	..	....	....	....	3	....	....	....	....	....	1	....	...	2	....	....	....
Oberlin	4,082	58	14.21	4	1	1	...	1	...	..	...	...	..	...	..	...	..	...	..	10	5	4	29	....	2	....	....	1	6	1	...	7	16	2	....
Olmsted Falls.....	330	5	15.15	....	....	1	1	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	4	....	....	....	....	....	2	....	1	....	....	....	....
Orrville	1,901	24	12.63	....	3	3	1	...	...	..	...	...	..	...	..	2	..	...	..	7	2	4	13	2	....	....	....	3	6	1	...	1	....	1	....
Osnaburg	558	6	10.75	....	....	2	...	...	2	..	...	...	..	...	..	...	..	...	..	1	....	1	2	....	1	....	....	....	1	....	...	....	....	1	....
Ottawa	2,322	15	6.80	....	....	5	...	1	...	..	...	1	..	...	..	...	..	2	..	1	1	....	9	1	1	....	1	....	2	1	...	1	....	....	....
Oxford	2,009	34	16.92	....	....	2	...	...	...	..	...	...	..	...	..	...	..	2	..	4	....	4	9	....	1	....	1	....	3	2	...	4	....	....	....
Patterson	219	3	13.70	1	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	2	....	....	....	....	....	1	....	...	....	1	....	....
Pemberville	1,081	2	1.85	....	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	1	....	1	....	....	....	....	....	...	....	....	....	....
Plain City.........	1,432	18	12.57	5	....	2	...	...	...	1	...	...	..	...	..	...	..	...	..	7	3	2	6	....	....	....	....	1	1	....	...	3	3	....	....
Pleasant Hill......	557	11	19.75	1	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	4	1	1	5	2	1	....	....	....	2	....	...	....	1	....	1
Pleasant Ridge....	953	8	8.39	2	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	4	....	1	4	1	....	....	....	....	....	....	...	1	....	....	....
Port Washington..	424	4	9.43	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	3	3	....	1	....	....	....	....	....	1	....	...	....	....	....	3
Prospect	983	18	18.31	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	4	1	3	13	1	3	....	....	....	3	....	...	2	....	1	....
Put-in-Bay	317	3	9.47	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	1	1	....	....	....	....	....	....	...	....	1	1	....

Ravenna	4,003	47	11.74	2	....	6	2	....	....	....	....	1	....	....	....	....	....	....	....	11	1	8	23	2	1	....	1	2	8	....	1	3	....	2	3
Rawson	473	6	12.68	2	1	2	1	1	....	....	....	....	....	....	....	....	....	....	....	2	2	....	2	1	....	....	....	....	....	....	....	1	....	....	....
Reading	3,076	40	13.00	9	4	8	1	....	....	....	....	1	1	....	....	....	....	3	....	13	2	10	17	1	2	2	3	....	2	2	1	1	....	2	3
Republic	656	9	13.72	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	2	7	....	1	....	....	....	2	1	....	1	....	....	....
Richmond	373	3	8.04	1	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	1	....	....	1	....	....	....
Richwood	1,640	38	23.17	....	....	6	....	....	....	....	....	....	....	....	....	4	....	....	1	....	....	....	11	....	1	....	....	....	2	....	....	2	....	....	....
Ridgeway	447	2	4.47	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	1	....	....	....
Rockport	2,038	20	9.81	2	2	6	2	1	....	....	....	....	....	....	1	....	....	2	....	3	1	....	9	....	....	1	....	....	1	1	....	1	....	2	....
Rushsylvania	552	6	10.87	....	....	4	1	....	....	....	1	....	....	....	....	....	....	1	....	1	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....
Rushville	257	2	7.78	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
St. Bernard	3,384	53	15.66	12	6	9	....	3	1	....	....	1	....	....	....	....	....	4	....	13	2	3	27	3	4	1	1	2	....	2	....	11	3	1	3
St. Clairsville	1,210	20	16.53	2	1	5	2	....	....	....	....	1	....	....	....	....	....	1	....	5	2	3	9	2	2	....	....	....	1	1	1	2	....	1	2
Salesville	286	7	24.47	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	5	....	....	....	....	....	....	....	....	4	....	....	1
Salineville	2,353	28	11.90	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	2	1	6	....	1	....	1	1	1	1	....	1	....	1	1
Scio	1,214	10	8.24	2	....	6	....	2	....	....	....	....	1	....	....	....	....	4	....	1	1	....	1	....	1	....	....	....	....	....	....	....	....	1	4
Shawnee	2,966	33	11.13	3	2	1	....	1	....	....	....	....	....	....	....	....	....	....	....	11	4	4	9	1	1	....	....	1	1	1	....	2	4	2	1
Shreve	1,043	13	12.46	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	1	1	6	2	....	....	....	....	4	....	....	....	....	2	....
Smithfield	503	12	23.84	....	....	2	....	....	....	....	....	....	....	....	....	....	....	1	....	7	....	2	2	....	....	....	....	....	1	....	....	....	....	1	....
Smithville	474	9	18.99	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	8	4	1	....	....	....	....	....	....	1	....	....	2
Somerset	1,124	7	6.23	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	1	5	....	....	....	1	....	3	....	....	....	2	....	2
South Brooklyn	2,343	49	20.91	4	4	12	2	3	....	....	....	....	1	....	....	....	....	3	....	3	1	2	18	2	1	....	1	....	4	....	....	7	3	3	2
Spencerville	1,874	5	2.67	....	4	4	....	....	1	....	....	....	....	....	....	3	....	....	....	....	....	....	1	....	....	....	....	....	1	....	....	....	....	....	....
Springboro	433	8	18.48	3	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	1	....	1	6	....	....	2	1	....	1	....	....	1	....	....	....
Strasburg	461	8	17.35	2	....	4	....	....	....	....	....	....	....	....	1	....	....	2	....	1	....	1	3	....	1	....	1	....	....	....	....	1	....	....	2
Stryker	1,206	8	6.63	....	....	3	1	....	....	....	....	....	....	....	....	....	....	2	....	4	....	2	1	....	....	....	....	....	1	....	....	....	....	....	....
Swanton	887	2	2.25	....	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....
Slyvania	617	8	12.96	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	5	1	....	....	....	1	....	....	....	1	....	1	....
Tippecanoe City	1,703	26	15.27	1	1	6	1	....	1	....	....	1	....	....	....	....	....	1	....	5	2	2	11	1	2	....	....	....	4	....	....	2	....	2	....
Toronto	3,526	10	2.84	....	....	10	....	....	....	....	....	....	....	....	....	10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Tiro	293	4	13.65	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	2	1	1	1	1	....	....	....	....	....	....	....	....	....	....	....
Uhrichsville	4,582	40	8.73	8	1	8	....	....	2	....	2	....	....	....	....	....	....	1	....	9	3	3	16	6	1	....	....	....	3	1	....	4	1	2	4
Union City	1,282	13	10.14	1	1	3	....	1	1	....	....	....	....	....	....	....	....	....	....	3	....	....	7	....	....	1	....	....	....	....	....	2	....	....	2
Unionville Center	259	2	7.72	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	1	....	....	....	....	....	....	1	....	....	....
Utica	826	7	8.47	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	1	1	2	....	....	....	....	....	1	....	....	1	2	1	....
Van Buren	367	6	16.35	....	1	2	....	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....	1	....	....	....	....	....	....	....	4
Vandalia	284	4	14.06	1	1	1	....	....	....	....	....	....	....	....	....	....	....	1	....	3	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Vermillion	1,184	32	27.03	2	3	4	....	2	....	....	....	....	....	....	....	....	....	1	....	2	1	1	23	....	1	....	....	....	5	....	....	6	1	2	....
Versailles	1,478	21	14.21	1	....	5	....	....	....	....	....	....	....	....	....	....	....	2	....	9	2	5	7	....	1	....	....	2	3	....	....	....	....	....	1
Wadsworth	1,764	26	14.74	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5	4	1	18	....	3	....	....	1	6	1	....	6	2	1	....
Wapakoneta	3,915	77	19.67	18	5	17	....	4	2	....	....	1	2	....	....	....	....	2	1	15	1	9	37	7	1	1	5	3	2	....	....	6	4	4	....
Wauseon	2,148	17	7.91	....	....	5	1	1	....	....	....	....	....	....	....	....	....	1	....	3	1	1	7	3	2	....	....	....	2	....	....	....	....	2	....
Waverly	1,854	20	10.79	4	1	7	1	....	....	....	....	1	....	....	....	....	....	....	....	3	....	3	9	....	1	....	2	1	3	....	....	1	....	1	....
Waynesfield	542	9	16.61	2	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	3	....	2	1	....	....	....	....	....	....	....	....	....	2	....	1
Wellington	2,094	44	21.01	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	13	2	5	25	....	2	....	....	....	13	....	....	4	....	5	....
Western Star	148	2	13.51	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	1	....	....	....	1	....	....	....	....	....	....	....	....
Westerville	1,462	3	2.05	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	2	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....
West Jefferson	803	17	21.17	....	3	2	....	1	....	....	....	....	....	....	....	....	....	1	....	3	....	3	1	....	....	....	....	....	....	1	....	....	....	....	....
West Leipsic	346	3	8.67	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	2	....	....	....	....	....	1	....	....	1	....	....	....
West Mansfield	875	18	20.57	2	....	7	....	1	....	....	....	....	....	....	....	2	....	1	....	2	....	1	5	....	1	....	....	....	1	....	....	2	....	2	1
West Milton	904	8	8.85	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	4	1	1	3	....	....	....	....	....	....	....	....	1	....	....	....
West Salem	656	6	9.15	....	....	2	....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	4	2	....	....	....	....	2	....	....	....	....	....	3
Weston	953	8	8.39	....	1	1	....	....	1	....	....	....	....	....	....	....	....	....	....	2	1	1	4	....	....	....	....	1	....	1	....	2	....	1	....
Williamsport	547	6	10.97	....	1	1	....	....	....	....	....	....	....	....	....	....	....	1	....	4	....	2	1	....	....	1	....	....	....	....	....	....	....	....	....

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING THE YEAR 1901 — Continued.

268 Villages. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Willoughby	1,753	24	13.68	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	9	1	....	....	....	....	4	....	...	....	....	....	....
Willshire	560	5	8.93	1	....	1	...	...	1	..	...	...	..	...	..	...	..	...	..	3	....	1	1	....	1	....	....	....	....	....	...	....	....	....	....
Wilmington	3,613	27	7.47	1	3	4	...	...	...	..	...	...	..	...	..	...	..	1	..	1	....	1	22	2	1	....	....	1	8	3	...	3	....	....	....
Windham	283	10	35.34	1	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	1	....	7	1	3	....	....	....	....	....	...	2	....	....	....
Winton Place......	1,219	25	20.51	4	3	4	1	2	...	..	...	...	..	...	..	...	..	1	..	8	2	5	13	....	....	1	1	2	1	2	...	3	....	....	3
Woodsfield	1,801	35	19.43	5	6	1	...	...	...	..	...	...	..	...	..	...	..	1	..	6	1	5	5	....	1	....	....	....	4	....	...	....	....	....	....
Worthington	443	5	11.29	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	1	....	4	1	....	....	....	....	1	....	...	2	....	....	....
Wyoming	1,450	18	12.41	1	1	2	1	...	1	..	...	...	..	...	..	...	..	...	..	2	1	1	13	....	....	1	....	....	2	....	...	....	....	1	....
Zanesfield	278	3	10.79	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	2	2	....	....	....	....	....	....	...	....	....	....	2
Zoar	290	2	6.90	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	2	1	....	....	....	....	....	....	...	....	....	....	....
Total	349,393	4,458	12.76	345	216	739	83	120	49	11	24	29	13	7	18	47	4	160	21	845	172	469	1,913	200	174	50	66	114	451	75	15	389	154	212	244

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING THE YEAR 1901 — Continued.

497 Townships. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Adams —																																			
Franklin	1,572	8	5.09	1		3												3		2		2	2						2						1
Meigs	2,350	13	5.09	7		4									1			3					1									1		1	
Allen —																																			
Monroe	1,537	8	5.14			5		5												2	1	1	1				1								
Shawnee	1,493	5	3.28																	2		1	2					1	1				1		
Ashland —																																			
Hanover	941	1	1.06			1	1																												
Jackson	923	14	15.20	6		4									2								9	3					2			1		1	
Milton	869	5	5.75	2																1			2									1			
Orange	1,201	8	6.65	2																3	2		5		1				2						3
Perry	1,124	2	1.78																				2				1					1			
Sullivan	808	4	4.95			1												1		2	1	1	1						1						1
Ashtabula —																																			
Andover	719	19	26.42		1															2	1	1	17	1				1	7			2			
Ashtabula	1,038	21	20.23	3																1	1		18	4					1	1		3	2		
Cherry Valley	643	10	15.55	1		1		1												3	1	2	4						1			2	1		
Dorset	878	6	6.84																				1					1					4	1	
Harpersfield	893	5	5.60																	1			3						2			1	1		
Geneva	1,254	22	17.54	2		2														4	2		14	2	2		1	1	3			2		2	
Kingsville	1,412	27	18.41	3		2						1											11		2		1		7	1				1	
Lenox	742	7	9.43			1	1													1	1		4		1							2		1	
Morgan	562	8	14.24		1	1												1		2	1	1	5	1			1					1			
Orwell	981	22	22.43	1		3												2		3		3	11	2			1		3			3	4		
Plymouth	723	10	13.83			1						1								1		1	8		1			1	2			3			
Richmond	848	17	20.05		1	6	1	1							2			2		2		2	5						1			1	1	1	1
Saybrook	1,733	5	2.88	1	1	1		1												3	1	1													
Sheffield	609	5	8.21	1																			5				1					3			
Trumbull	855	11	12.87	1		1														4	2	1	4						2					1	
Wayne	685	5	7.30			1			1											1	1		3									3			
Williamsfield	900	1	1.11																				1						1						

Abstract of the Reports of Deaths and their Causes During the year 1901 — Continued.

497 Townships. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Athens																																			
Ames	1,256	3	2.38	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	2	....	....	....	....	....	1	....	....	1	....	....	....
Carthage	1,136	7	6.16	1	....	2	....	....	....	....	....	1	....	....	1	....	....	....	....	1	....	1	3	1	....	....	....	....	1	....	....	1	....	....	....
Dover	1,488	17	11.42	....	....	5	2	1	1	....	....	....	....	....	....	....	....	1	....	....	....	....	9	1	....	1	....	....	1	1	....	2	....	3	....
Lee	540	7	12.96	....	....	1	....	....	....	....	....	....	....	....	1	....	....	....	....	2	1	1	4	....	....	....	....	1	2	....	....	1	....	....	....
Troy	3,762	3	.80	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....
Auglaize —																																			
Goshen	908	3	3.30	....	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	1	1	....	1	....	....	....	....	....	1	....	....	....	....	....	....
Jackson	731	8	10.94	....	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	6	....	....	1	1	....	1	....	....	1	1	....	....
Moulton	1,286	2	1.56	....	....	2	1	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Salem	959	3	3.13	....	....	3	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Belmont —																																			
Goshen	2,047	29	14.17	3	....	3	....	2	....	....	....	....	....	....	....	....	....	....	....	7	2	5	19	....	3	....	....	1	8	1	....	6	....	....	2
Kirkwood	1,662	15	9.03	....	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Smith	1,710	5	2.92	....	....	5	2	....	....	....	....	....	....	....	....	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wayne	1,415	7	4.95	....	1	1	....	....	1	....	....	....	....	....	....	....	....	....	....	2	....	1	3	....	1	....	....	....	2	....	....	....	....	1	....
Brown —																																			
Byrd	1,135	8	7.05	....	....	3	....	....	....	....	....	....	....	....	....	2	....	1	....	1	....	1	4	....	1	....	....	....	....	....	....	2	....	....	....
Jackson	924	2	2.16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	2	....	....	....	....	....
Jefferson	618	14	22.65	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6	2	3	8	1	1	....	....	....	....	2	....	1	....	....	....
Perry	2,090	27	12.92	2	4	5	....	2	1	1	....	....	....	....	....	....	....	....	1	5	1	2	16	1	....	1	1	1	1	2	....	3	1	....	4
Sterling	1,264	11	8.70	4	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	1	1	....	....	....	1	....	....	....	....	....	....	....	....
Washington	1,313	5	3.81	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	2	....	....	1
Butler —																																			
Madison	1,779	2	1.12	....	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....
Oxford	1,562	26	17.96	....	....	2	....	1	....	....	....	....	....	....	....	....	....	....	....	8	....	3	11	1	2	....	....	1	2	....	....	1	5	....	....
Reiley	1,113	12	10.78	....	1	2	....	....	1	....	....	....	....	....	....	....	....	1	....	2	....	2	7	....	....	....	....	1	....	....	....	5	....	....	1
St. Clair	1,388	16	11.53	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	2	14	1	....	1	....	....	1	....	....	....	....	....	....
Union	1,743	16	9.18	2	....	4	....	....	....	....	....	2	....	....	....	....	....	....	....	4	....	4	6	....	1	....	....	....	5	....	....	....	....	2	1

Carroll —																																			
Brown	1,345	10	7.45			3	3																5	2	2				1					2	
East	606	5	8.25																				5	2								1			
Fox	1,149	5	4.35			3	1						1					1					2												
London	909	5	5.50																	2			2									2		1	
Washington	631	5	7.88																	3	1	2	2						1			1			
Champaign —																																			
Concord	1,053	7	6.65			3										1		2					2						2				2		
Goshen	1,111	24	21.60																	7	1	3	16	1	3		1	2	3			3		1	
Harrison	741	6	8.06		2	1														1	1		4				1	1	1			1			2
Urbana	1,208	1	.83			1																													
Clark —																																			
Madison	1,175	13	11.06	3	1	4		2				2								4	1		5	1					1			2			
Harmony	1,830	5	2.73																															1	
Clermont —																																			
Goshen	1,456	4	2.74			1														1		1	2									1			1
Jackson	1,292	7	5.42			2						2								3		3	2		1							1			1
Miami	2,835	66	23.42	7	3	5	1	2										2					47	6	4	2	1	2	14			13	5	9	4
Pierce	1,644	2	1.22			2	2																												
Tate	2,016	1	.50																	1	1														
Union	1,802	4	2.22			1										1							3						2			1			1
Washington	1,541	21	13.63	1	5	2								1				1		6		6	7	1	1	3			1			1			
Wayne	1,537	1	.65																				1									1			
Clinton —																																			
Jefferson	1,040	8	7.70		1	3			1														5		2			1				1			2
Vernon	983	3	3.05																	1		1	2		1				1						
Columbiana —																																			
Butler	1,523	11	7.22		1																		2								1	1			1
Hanover	1,455	7	4.81																	1	1													1	
Knox	1,918	17	8.73																	3	2	1	13		1				4			3		1	
Madison	930	9	9.68			1												1		6		2	2		2										2
Perry	1,114	2	1.75																	1		1												1	1
Salem	1,637	7	4.28	1		1	1																5				2		1						1
Unity	2,554	35	13.70	4	3	7	1		2		2				1			1		5	1	4	22	4	3	3			3			2		1	2
West	1,757	15	8.55			3	1								1			1		2			10	3	3			1	1						
Coshocton —																																			
Adams	968	6	6.09			1														2		2	3	1	1							1			
Bethlehem	730	6	8.22			2		1								1							4						2			2			
Franklin	1,137	17	14.95	2																3	1	1	11	1	4		1		2		2			1	2
Jackson	1,696	5	2.95			3	1											2					2					1	1						
Keene	799	14	17.52																				5		2				1			2			
Linton	1,216	15	12.34	1		3												2		6	2	2	6			1			3						1
Monroe	909	11	12.10	1	1	3		2									1			4		1	4		2		1					1			3
Newcastle	924	9	9.74		1	2												2		1		1	4	1	1				1				1	1	2
Tuscarawas	1,666	34	20.41	2		22	12	2					1			2		4	1	8	2	4	4						2			1			
Crawford —																																			
Chatfield	1,006	1	.99																	1	1														2
Dallas	465	4	8.60	1																1		1													
Holmes	1,500	5	3.33	1	1	4						1				1		2																1	
Jefferson	697	15	21.52	2		1			1											5	1	3	6	2	1								1		
Liberty	1,566	5	3.19																				4			1	1						1		
Sandusky	569	8	14.06		1	1													1				2										2	2	

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING THE YEAR 1901 — Continued.

497 Townships. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Cuyahoga —																																			
Bedford	1,140	3	2.63	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	1	....	....	....	....	....	....	....	....	....	....	....
Brecksville	1,053	15	14.24	....	....	3	....	....	2	....	....	1	....	....	....	....	....	....	....	5	....	3	7	....	1	....	....	....	....	....	....	3	....	....	1
Brooklyn	1,468	9	6.13	....	....	5	....	2	....	....	....	....	....	....	....	....	....	2	....	....	....	....	2	1	....	....	....	....	1	....	....	....	....	2	....
Chagrin Falls	414	3	7.23	....	....	3	....	....	....	....	....	....	....	....	....	2	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Dover	2,233	8	3.58	1	....	4	2	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	4	....	....	1	....	....	....	....	....	2	....	....	1
Euclid	2,634	24	9.11	4	....	6	4	1	....	....	....	....	....	....	....	....	....	....	....	5	2	3	10	1	....	1	....	1	2	....	....	4	....	3	2
Newburgh	5,909	13	2.20	....	....	3	1	....	....	....	....	....	....	....	....	....	....	1	....	7	....	4	2	....	....	....	....	....	1	....	....	1	....	....	....
Olmsted	1,614	21	13.01	....	....	4	2	....	....	....	....	1	....	....	1	....	....	....	....	7	4	1	9	1	....	....	....	....	3	....	....	2	....	1	....
Royalton	1,128	16	14.18	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	1	....	....	....	2	....	....	....	....	2	....
Strongsville	1,178	6	5.09	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	4	1	1	....	....	....	....	....	....	1	....	1	....
Warrensville	1,634	13	7.96	....	....	2	....	....	....	2	....	....	....	....	....	....	....	....	....	2	....	....	9	4	1	....	....	....	....	....	....	3	....	....	....
Darke —																																			
Adams	1,954	3	1.54	....	....	3	2	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Butler	1,659	14	8.44	....	2	2	....	....	1	....	....	....	....	....	....	....	....	1	....	2	1	1	8	....	1	....	....	....	3	....	....	1	....	....	....
Franklin	1,635	15	9.17	....	3	4	....	....	....	....	1	....	....	....	....	1	....	2	....	4	2	2	6	1	....	....	....	....	2	....	....	....	....	1	1
German	1,376	8	5.81	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	2	6	1	1	....	....	....	2	....	....	2	....	....	....
Greenville	2,940	13	4.42	....	....	2	....	....	....	....	....	....	....	1	....	....	....	....	1	2	1	1	9	2	2	....	....	....	2	....	....	3	....	....	....
Harrison	1,212	8	6.60	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	....	....	....	2	1	....	....	....	....	....	1
Monroe	1,352	13	9.62	4	1	2	2	....	....	....	....	....	....	....	....	....	....	....	....	2	2	....	1	....	....	....	....	....	....	....	....	1	....	....	....
Neave	1,033	1	.97	....	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Patterson	1,475	16	10.85	3	2	6	3	....	....	....	....	....	....	....	....	....	....	3	....	6	1	3	4	....	....	....	1	....	2	1	....	....	....	....	....
Richland	1,217	8	6.57	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	3	1	2	4	2	....	....	....	....	1	....	....	....	....	....	1
Van Buren	1,486	8	5.38	....	3	1	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	5	....	1	1	....	....	1	....	....	2	....	1	....
Wabash	1,334	2	1.48	....	....	2	....	....	....	....	....	....	....	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wayne	1,371	23	16.77	4	4	6	2	1	....	....	....	....	....	....	....	....	....	1	....	4	....	1	13	2	....	....	....	1	2	4	....	1	....	....	2
York	942	8	8.60	....	....	2	....	....	....	....	....	....	....	....	....	....	....	2	....	6	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Defiance —																																			
Mark	1,685	12	7.12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	11	3	....	....	....	....	3	....	....	2	....	....	2
Richland	1,444	10	6.93	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	2	5	....	....	1	....	....	2	....	....	2	....	....	1
Washington	1,265	4	3.16	1	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	1	....	1	2	....	....	....	....	....	1	....	....	....	....	....	....

Delaware —																																			
Concord	1,305	6	4.60	1		1			1														5						1			2			
Harlem	1,005	4	3.98																	2		2											2		
Marlborough	397	4	10.08			2		1	1											1			1					1							
Thompson	709	5	7.05	1	1															1			4	1			1					1			
Trenton	869	7	8.01			1					1									1			5				1	1	1			1			
Erie —																																			
Florence	1,096	13	11.86	5		6	1	5															6									1		1	
Groton	786	2	2.55			2	2																												
Fairfield —																																			
Bloom	1,500	15	10.00			2														5		2	8	3					3			2			
Hocking	2,313	1	.43																				1	1											
Pleasant	1,665	8	4.80	1		3	1	1										1					2					1				1		1	2
Richland	956	20	20.92	2	1	7	2	3								2				5	3	2	6	2					2			2	2		3
Fayette —																																			
Concord	733	4	5.46			1														2		2	1												1
Madison	1,317	10	7.59	1	1	3	2											1		3		1	1					1						1	1
Marion	932	2	2.15																	2		1													
Franklin —																																			
Brown	800	3	3.75																	2		1	1												
Hamilton	1,474	7	4.75	2		1			1											3			3				1								
Madison	2,036	1	.49			1	1																												
Perry	1,676	4	2.39		1	2					1					1							1						1					1	
Prairie	1,582	19	12.01	4		8		3										5		3		3	4					1				3	2	1	1
Sharon	1,356	2	1.47																				2									1			
Washington	964	9	9.34			1		1												6	2	3	2	2											1
Fulton —																																			
Dover	1,288	25	19.41	2		8		5				1						1	1				3	1					1			1	2		
Gorham	1,332	11	8.26			2										1		1		2		2	6					1	2					1	
Royalton	1,198	5	4.15																	4	1	2	1												
Swan Creek	1,871	1	.53			1										1																			
Gallia —																																			
Cheshire	1,851	7	3.24	4	2	2	1											1		1	1		2										2		3
Greenfield	1,253	13	10.38			2												2		1	1		10	2	2				1	1		3			
Morgan	1,232	12	9.74		1															5	2	3	2						2					3	
Perry	1,177	3	2.55																	1		1	2	1					1						
Raccoon	1,273	2	1.57			2	2																												
Springfield	1,844	34	18.49																	2	1	1													
Walnut	1,687	1	.59			1												1																	2
Geauga —																																			
Auburn	729	8	10.97		1	1	1																												
Chester	716	10	13.97			2														3		1	1		1										4
Claridon	764	8	10.47		2															2			3						2					1	
Hambden	603	10	16.58		1															2		2	2		2										
Huntsburg	809	8	9.89	2	1	2		1	1											1		1	5	1					4						
Montville	758	1	1.32																	1	1														
Munson	780	11	14.10			1	1													6	3	1	3		1				1				1		
Parkman	849	2	2.36			2	1											1																	
Russell	695	9	12.95																	2		2	5		1							1			
Thompson	909	14	15.40																	3	2		11	1					5			5			
Troy	897	6	6.69			2		1				1											4	1								1			

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING THE YEAR 1901 — Continued.

497 Townships. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Greene —																																			
Beaver Creek....	2,070	8	3.87	1	....	3	...	...	...	..	...	...	..	...	..	...	..	3	..	1	....	1	2	....	1	....	....	....	....	....	...	1	1	....	....
Cedarville	1,278	10	7.82	....	....	4	...	...	...	..	...	...	..	...	3	...	..	...	..	1	1	....	5	....	....	....	....	....	3	....	...	2	....	....	3
New Jasper......	874	1	1.14	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	1	....	1	....	....	....	....	....	...	....	....	....	....
Silver Creek.....	1,309	3	2.29	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	2	....	....	....	....	....	....	....	...	2	....	....	....
Guernsey —																																			
Adams	717	5	6.95	....	1	1	1	...	...	..	...	...	..	...	..	...	..	...	..	2	....	2	1	....	1	....	....	....	....	....	...	....	....	....	....
Center	1,821	10	5.43	....	2	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	1	4	....	....	....	1	....	1	....	...	....	....	2	1
Jackson	1,998	16	8.01	....	....	3	...	...	2	..	...	...	..	...	..	...	1	...	..	5	....	3	....	....	....	....	....	....	....	....	...	....	....	3	....
Knox	845	7	8.28	....	2	2	1	1	...	..	...	...	..	...	..	...	..	...	..	2	....	1	3	1	....	....	1	....	1	....	...	....	....	....	....
Liberty	1,054	20	18.98	2	3	7	4	1	...	..	...	...	..	...	..	...	..	...	..	5	....	5	8	2	....	....	....	....	2	....	...	1	....	....	1
Madison	883	12	13.59	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	4	....	....	....	....	....	3	....	...	1	....	....	....
Westland	711	4	5.63	....	....	2	...	...	...	..	...	...	..	...	..	...	..	2	..	....	....	....	2	....	2	....	....	....	....	....	...	....	....	....	....
Hamilton —																																			
Anderson	3,753	28	7.46	2	....	4	...	1	1	..	...	...	..	2	..	...	..	...	..	8	2	4	12	2	1	....	2	....	....	1	1	5	....	....	....
Colerain	3,410	30	8.80	2	1	7	...	...	...	..	...	...	..	...	..	...	..	1	..	7	1	3	16	....	....	....	2	....	3	1	...	....	....	....	....
Columbia	2,298	13	5.66	5	....	4	...	...	...	1	...	1	..	...	..	...	..	...	..	....	....	....	8	1	....	1	1	1	....	1	1	1	....	1	....
Green	4,532	54	11.92	1	3	7	...	1	2	..	...	...	..	...	..	...	..	3	..	4	2	2	23	4	3	1	....	....	4	....	...	9	....	2	8
Millcreek	5,304	46	8.67	....	....	9	1	1	1	..	...	...	..	...	..	...	..	4	..	1	....	....	12	....	....	2	....	2	4	....	...	....	....	....	1
Spencer	257	2	7.78	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	2	....	....
Springfield	3,929	15	3.82	....	....	3	...	...	...	..	...	...	..	...	..	...	..	1	2	....	....	....	1	....	....	....	....	....	....	....	...	1	1	....	....
Whitewater	1,291	9	6.97	....	....	1	...	...	...	..	...	1	..	...	..	...	..	...	..	2	2	....	6	1	....	....	....	....	....	1	...	2	....	....	....
Hancock —																																			
Delaware	1,056	13	12.31	....	....	4	...	...	1	..	...	...	2	...	..	...	..	1	..	2	....	1	5	1	3	....	....	....	1	....	...	....	1	1	....
Marion	1,079	12	11.12	1	....	2	...	...	1	..	...	1	..	...	..	...	..	...	..	3	1	1	5	....	2	....	....	....	2	....	...	....	....	2	....
Portage	808	2	2.48	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	2	....
Van Buren......	789	1	1.27	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	1	....	....	....	....	....	....	....	...	....	....	....	....

Hardin —																																			
Cessna	804	4	4.98			4													3																
Dudley	1,320	5	3.79	1																			1				1								
Goshen	953	1	1.25																				1		1										
McDonald	1,947	1	.52																				1						1						
Marion	1,098	1	.91			1	1																												
Taylor Creek	864	3	3.47																	3		1													
Harrison —																																			
Franklin	677	5	7.39																				1						1						
Moorefield	1,222	6	4.64	1		1		1												2	1		3						1			2			3
Washington	1,247	2	1.60																				2		1					1					
Henry —																																			
Harrison	1,232	8	6.49			1		1												2		1	5		1				1			1			
Marion	1,568	3	1.91			1												1		1		1													
Monroe	1,658	9	5.43		3																		1		1									5	
Richfield	1,708	15	8.78	3	2	8			1		1	2			1			1		3	2	1	4					1	2			1			
Ridgeville	1,241	2	1.61																	2		2													
Washington	1,188	8	6.73			2		1										1		5	3		1				1								1
Highland —																																			
Hamer	918	6	6.54																	1		1	3									2	2		
New Market	990	1	1.01			1	1																												
Penn	1,154	3	2.60																				3	1	1							1			
Hocking —																																			
Laurel	1,081	5	4.63																																
Marion	1,215	1	.82			1																													
Perry	1,531	5	3.25			4		3	1														1	1											
Salt Creek	1,509	7	4.64	3		4	1	3												1	1		1		1								1		
Washington	876	2	2.28				1																												
Holmes —																																			
Prairie	937	4	3.27																	1		1	3				1	1	1						1
Richland	1,023	10	9.80			2												1		5		2	1						1				1	1	
Huron —																																			
Clarksfield	1,051	12	11.42			4	2	1	1											2		2	5						4					1	
Fairfield	1,116	16	14.34	2		1	1													7	1	4	6		1				4						
Greenwich	612	1	1.63			1																													
Lyme	811	1	1.23			1	1																												
Norwalk	1,317	12	9.11			1												1		2	1	1	8		1				6					1	
Richmond	787	2	2.54																	1		1	1						1						
Townsend	977	8	8.19																	1		1	6		1							3		1	
Jackson —																																			
Coal	4,267	30	7.03		4	7		2				1						1	2	9		4	8	1					1			6			1
Madison	1,328	3	2.26			3	2											1																	
Milton	2,304	6	2.60			6	5								1																				
Jefferson —																																			
Springfield	1,078	4	3.72			2					1						1			1		1	1						1						3
Wells	1,195	6	5.02			1	1													2	1		3		1				2						

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING THE YEAR 1901 — Continued.

497 Townships. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Knox —																																			
Berlin	751	11	14.65	1	....	4	2	....	....	....	....	....	....	....	....	....	....	1	1	4	1	1	3	....	....	....	....	....	1	....	....	2	....	....	2
Clay	655	4	6.11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	1	1	1	....	....	....	....	....	1	....	....	....	....	....	....
Harrison	588	3	5.10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	1	....	....	....	....	....	....	....	....	....	1	....	....
Jackson	798	5	6.27	....	....	3	2	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	2	....	....	....	....	....	....	....	....	2	....	....	....
Milford	762	15	19.69	1	2	2	....	1	....	....	....	1	....	....	....	....	....	....	....	6	....	2	3	1	....	....	....	....	1	....	....	1	....	1	....
Miller	755	4	5.30	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	2	....	....	....
Morgan	650	2	3.08	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Pleasant	818	3	3.67	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	2	....	....	....	....	....	....	....	....	....	....	....	2
Wayne	707	1	1.42	....	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Lake —																																			
Concord	706	11	15.58	....	....	6	....	....	....	....	....	....	....	....	....	....	....	2	....	1	1	....	3	....	2	....	....	....	....	....	....	1	....	1	....
Kirtland	1,135	9	7.93	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4	2	1	....	....	....	....	....	....	1	....	....	....
Painesville	1,853	19	10.25	....	....	2	....	....	....	....	....	....	....	....	....	....	....	1	....	6	1	2	11	3	1	....	....	....	1	....	....	....	....	....	....
Perry	1,687	8	4.75	3	....	2	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....	5	....	....	....	2	....	1	....	....	1	....	....	1
Lawrence —																																			
Rome	3,776	3	.79	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	1	....	....	....	....	1	....	....	....	....	....	....
Licking —																																			
Burlington	922	11	11.93	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10	1	....	....	....	1	5	....	....	....	....	....	1
Etna	955	18	18.85	1	1	3	....	....	1	....	....	....	....	....	....	....	....	2	....	5	2	2	10	1	....	....	....	2	1	....	....	2	....	....	....
Fallsburg	836	9	10.77	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6	3	3	2	....	....	1	....	....	....	....	....	1	1	....	....
Granville	974	5	5.13	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	....	....	....	....	....	....	....	2	1	1	....
Hanover	983	2	2.03	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Lima	1,090	14	12.84	....	....	2	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	12	....	....	....	....	....	3	....	....	4	....	....	....
McKean	824	5	6.07	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	2	1	....	....	....	....	1	....	....	....	....	....	1
Mary Ann	827	3	3.63	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	....	....	2	....	....	....	....	1	....	....	....
Perry	807	3	3.72	1	....	2	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....
Logan —																																			
Bloomfield	828	4	4.83	2	1	3	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	2
Perry	1,047	15	14.33	....	....	2	....	....	....	....	....	....	....	....	....	....	....	2	....	1	1	....	8	1	1	....	....	....	....	1	....	....	2	1	....
Pleasant	978	1	1.02	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	....
Richland	2,191	8	3.65	3	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	4	....	....	....	....	....	....	1	....	....	....	1	1
Stokes	1,471	4	2.72	....	....	4	....	....	....	....	....	....	....	....	....	2	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1

Lorain —																																			
Brighton	490	2	4.08	1	....	2	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Brownhelm	1,100	5	4.55	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5	....	2	....	....	....	2	....	....	1	....	....	....
Carlisle	1,510	1	.66	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Grafton	848	4	4.72	....	1	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....
Lagrange	948	5	5.27	....	1	1	....	....	....	....	1	....	....	....	....	....	....	....	....	2	1	1	2	....	....	....	....	....	2	....	....	....	....	....	1
Rochester	402	4	9.95	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Lucas —																																			
Adams	2,090	18	8.61	3	4	4	....	....	1	....	1	....	....	1	1	....	....	....	....	....	....	....	10	....	....	....	....	1	2	....	....	4	1	3	3
Jerusalem	1,581	18	11.38	3	5	4	2	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....	8	....	....	....	1	....	1	2	....	4	....	....	....
Maumee	1,716	17	9.91	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	2	....	5	1	....	....	....	....	4	....	....	....	....	....	....
Oregon	2,702	36	13.32	6	4	6	1	2	....	....	....	1	....	1	....	1	....	....	....	3	....	2	13	2	....	....	2	2	1	1	....	3	....	4	4
Providence	1,270	21	16.54	3	3	10	....	3	3	....	....	....	....	....	1	....	....	....	....	3	2	1	8	1	....	....	2	3	1	....	....	1	....	....	2
Washington	3,449	43	12.46	6	11	18	....	2	4	....	....	....	3	....	....	2	....	1	....	7	....	2	18	3	1	4	....	....	5	2	....	1	....	....	1
Sylvania	1,270	14	11.02	....	....	3	1	1	....	....	....	....	....	....	....	....	....	....	....	3	1	2	7	....	....	....	....	....	....	....	....	4	1	....	....
Madison —																																			
Canaan	881	13	14.76	....	....	3	....	....	2	....	....	....	....	....	1	....	....	....	....	6	1	4	4	1	1	....	....	1	....	1	....	....	....	....	....
Deercreek	882	19	21.54	3	1	5	....	1	1	....	....	1	....	....	....	....	....	....	....	3	....	1	9	....	1	....	....	1	3	....	....	2	....	2	....
Pike	1,095	7	6.39	....	5	2	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	1	3	....	....	....	....	....	1	....	....	1	....	1	....
Mahoning —																																			
Berlin	725	5	6.90	....	....	2	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	3	1	....	....	....	....	1	....	....	....	....	....	....
Boardman	863	5	5.79	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	4	....	1	....	....	....	1	....	....	....	....	....	....
Goshen	1,406	7	4.98	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	3	....	1	....	....	....	....	....	....	....	....	....	....
Green	1,489	11	7.39	....	3	2	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	9	2	4	....	1	....	2	....	....	....	....	....	....
Smith	2,136	10	4.68	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Youngstown	3,161	4	1.27	....	....	4	1	....	....	....	....	....	....	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Marion —																																			
Bowling Green	978	3	3.07	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	2	....	....	....	....	....	1	....	....	....	....	....	....
Green Camp	762	3	3.94	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	2	1	....	....	....	....	....	....	....	....	1	....	....	....
Montgomery	926	15	16.20	1	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	4	....	3	2	....	1	....	....	1	....	....	....	....	....	1	....
Pleasant	1,109	3	2.71	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	1	1	....	1	....	1	....	....	....	....	....	....	....	....	....	....
Salt Rock	619	1	1.61	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....
Waldo	644	3	4.66	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	1	....	1	....	....	....	....	....	....	....	....	1	....
Medina —																																			
Brunswick	950	4	4.21	....	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	3
Chatham	904	10	11.06	....	....	2	....	....	....	....	....	....	....	....	....	....	....	1	....	2	....	2	5	3	....	....	....	....	1	....	....	1	....	1	1
Harrisville	987	4	4.05	....	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	3	1	....	....	....	....	....	....	....	2	....	....	....
Medina	671	3	4.47	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	2	....	1	....	....	....	1	....	....	....	....	....	....
Montville	1,743	1	.57	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....
Sharon	1,098	11	10.02	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	1	2	8	....	1	....	....	1	1	1	....	3	....	....	....
Spencer	963	3	3.12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	1	....	....	....	....	....	....	....	....	1	....	1	....
York	983	6	6.10	2	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	2	....	2	2	....	....	....	....	....	1	....	....	1	1	....	....
Meigs —																																			
Chester	1,597	27	16.91	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	9	....	6	10	1	2	....	....	....	4	....	....	3	....	....	....
Scipio	1,382	3	2.17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	2	1	....	....	....	....	....	....	....	1	....	....	1
Mercer —																																			
Butler	1,368	1	.73	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Franklin	1,603	26	16.22	2	1	9	1	....	....	....	....	....	....	....	....	....	....	2	....	4	....	4	5	....	....	....	2	....	1	2	....	....	....	2	1
Recovery	1,010	1	.99	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

Abstract of the Reports of Deaths and their Causes During the year 1901 — Continued.

497 Townships. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Miami —																																			
Bethel	1,596	15	9.40	1	....	3	...	...	...	..	...	...	..	...	..	...	..	3	..	1	1	....	8	2	1	....	....	....	2	1	...	....	2	....	....
Newberry	2,316	24	10.36	5	5	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	2	10	....	....	2	1	....	4	1	...	2	....	4	....
Newton	1,980	28	14.14	8	2	2	...	...	...	..	...	...	..	...	1	...	..	...	..	7	....	5	14	....	....	....	2	....	5	....	...	5	....	1	2
Spring Creek	1,422	14	9.85	1	....	1	...	1	...	..	...	...	..	...	..	...	..	...	..	3	....	3	7	....	....	....	....	....	3	....	1	2	....	1	2
Staunton	1,184	8	6.76	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	1	1	....	5	....	1	....	....	....	1	....	...	1	1	1	....
Union	2,803	2	.72	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	1	....	....	....	....	....	1	....	...	....	....	1	....
Washington	997	19	19.06	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	9	3	5	9	1	1	....	2	....	2	1	...	2	1	....	....
Monroe —																																			
Benton	1,026	11	10.72	....	....	2	...	1	...	..	...	...	..	...	..	...	..	1	..	6	....	2	3	....	....	....	....	....	....	....	...	2	....	....	1
Franklin	1,112	2	1.80	....	....	1	1	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	....	....	....	....	....	....	....	....	...	....	....	....	....
Ohio	1,750	3	1.71	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	3	....	....	....	....	....	1	....	...	....	....	....	....
Summit	695	4	5.76	....	....	1	...	...	...	..	...	...	..	...	..	...	..	1	..	1	....	1	2	....	....	....	....	....	1	....	...	1	....	....	....
Switzerland	1,039	1	.96	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	....	....	....	....	....	....	....	....	...	....	....	1	....
Montgomery —																																			
Butler	1,676	5	2.98	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	5	3	....	....	....	....	....	....	...	....	....	....	....
German	1,658	17	10.25	....	....	2	2	...	...	..	...	...	..	...	..	...	..	...	..	2	....	2	13	1	1	....	....	1	5	....	...	3	....	....	5
Mad River	2,310	6	2.60	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	2	....	2	4	....	1	....	....	....	....	....	...	....	....	....	....
Randolph	2,075	14	6.75	....	....	2	...	1	...	..	...	...	..	...	..	...	..	...	..	3	1	1	1	....	....	....	....	....	....	....	...	1	....	2	....
Washington	1,670	4	2.39	....	....	1	...	...	...	..	...	...	..	...	..	...	..	...	..	....	....	....	1	....	....	....	....	....	....	....	...	....	1	1	....
Morgan —																																			
Bloom	869	3	3.41	....	....	2	2	...	...	..	...	...	..	...	..	...	..	...	..	1	....	1	....	....	....	....	....	....	....	....	...	....	....	....	....
Center	953	5	5.35	....	....	....	...	...	...	..	...	...	..	...	..	...	..	...	..	3	....	1	2	....	....	....	....	....	1	....	...	....	....	....	....
Deerfield	839	7	8.34	1	....	2	...	...	...	..	...	2	..	...	..	...	..	...	..	....	....	....	4	1	....	....	....	1	....	....	...	2	....	1	3
Manchester	585	5	8.55	....	....	2	...	...	...	..	1	...	..	...	..	...	..	1	..	1	....	1	2	1	....	....	....	....	....	....	...	1	....	....	....
Meigsville	1,078	15	13.91	2	....	2	...	2	...	..	...	...	..	...	..	...	..	...	..	5	1	4	6	2	2	....	....	....	2	....	...	....	....	2	....
Penn	1,007	10	9.93	....	....	1	...	...	...	..	...	...	..	...	..	...	..	1	..	4	2	1	5	....	1	....	....	....	2	....	...	2	....	....	2
Union	1,272	3	2.37	....	1	2	...	...	1	..	...	...	..	...	..	...	..	1	..	1	....	1	....	....	....	....	....	....	....	....	...	....	....	....	1
York	751	5	6.66	....	....	4	...	2	...	..	...	2	..	...	..	...	..	...	..	1	....	1	....	....	....	....	....	....	....	....	...	....	....	....	....

Morrow —																																			
North Bloomfield	960	10	10.42			3						3								2		2	5	1	1			2				1			1
Perry	935	2	2.14																																
South Bloomfield	742	10	13.48																	5	3		5	3	1				1						
Troy	641	3	4.68			1		1															2												
Muskingum —																																			
Adams	568	5	8.82																	2	1		3	1	1							1			
Cass	977	2	2.05			1	1																1						1						
Clay	285	1	3.51																														1		
Falls	1,680	33	19.64	2	2	7	2	2				1						2		13	2	3	6	1	3							1		2	1
Highland	674	4	5.93			1	1													2		1	1	1											2
Madison	900	3	3.33			3	1												2																
Monroe	813	11	13.53	1		2		1										1		2	1		6						3			3			3
Newton	1,883	10	5.31	2	2	2						1								4	2	2	3	1	1		1							1	4
Richhill	1,219	6	4.92																				6			1			1			2			
Noble —																																			
Elk	1,357	3	2.21			2			1									1																1	
Jackson	1,152	4	3.47			1	1													2		2	1		1										
Jefferson	1,005	4	3.97			2						2											2						1			1			
Noble	1,407	10	7.11			2		1						1						2		2	5						5				1		
Seneca	934	4	4.29																				4	2	1				1						
Sharon	1,024	3	2.93																	1			1									1	1		
Stork	1,121	6	5.40	1		2	1	1												1			1						1				2		4
Ottawa —																																			
Allen	1,613	11	6.82	1	1	4		1										1					5	1		1						4		2	
Benton	2,341	19	8.12			2		2												2		2	10						1			2		3	1
Catawba Island	606	10	16.50	2																1		1	1										6		
Clay	1,151	10	8.69			3	2					1								1	1		2											2	
Danbury	1,687	6	3.56																	3	1	1												3	
Harris	1,176	4	3.40			2	1				1									1	1		1		1										
Put-in-Bay	723	8	11.06	2	1	2		1										1					5	1			1		1			2		1	
Salem	1,517	5	3.30			2	2																												
Paulding —																																			
Brown	1,700	22	12.94			9	5	2	1											7		7	6	2					1			3			
Emerald	1,159	2	1.73																	1		1	1									1			
Perry —																																			
Bearfield	923	5	5.42			1										1				4	4														1
Clayton	1,379	1	.73			1												1																	
Coal	807	16	19.84	4	4	6	4											2		6	3	3	2	1								1	2		
Harrison	1,658	2	1.20			2	2																												
Monroe	3,164	6	1.89			3	1									1		1					3						2			1			
Thorn	1,431	17	11.88	3		6		2										2		3		3	7	1		1		1	1	1		1		1	3
Pickaway —																																			
Madison	794	6	7.56																				6	1	2		1		1						
Walnut	1,455	20	13.75	6	1	2												2		2	1	1	3	1					1			1			
Pike —																																			
Seal	794	3	3.78																	1		1	2						1	1					
Sunfish	1,068	9	8.43	3		1											1			3		2	3												2
Union	778	8	10.28			1		1												5	1	3	1												1

Abstract of the Reports of Deaths and their Causes During the year 1901 — Continued.

497 Townships. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Portage —																																			
Atwater	652	12	18.42																	3	2	1	8	3				1	2			2		1	
Charlestown	688	4	5.81			4	4																												
Deerfield	1,101	12	10.81			4	3													1		1	4		1				3					2	
Hiram	704	3	4.26			2												2					1												
Nelson	794	18	22.67	1																5		2	10		1				2			5		3	
Ravenna	990	5	5.05																				1						1						
Shalersville	912	15	16.45	3		3		3												3	2	1	8	1	1				1			5		1	
Preble —																																			
Dixon	978	7	7.16																	5	1		2						1			1			
Gratis	1,351	8	5.92		2	3	3													2		2	3		1		1					1			
Harrison	2,218	4	1.80	1																			4		1			1	1	1					
Israel	1,257	22	17.50			3		1							1					4		1	11	2	1		1	1	1			4	3	1	1
Jackson	1,255	7	5.58			2												1		2			3						1			1			4
Jefferson	1,126	20	17.76			3			3											2		2	15	2					3	2		2			
Monroe	1,423	12	8.43			2														5	1	3	4	1	1			1	1					1	
Somers	918	7	7.62			1					1									3		1	3		1							1			
Twin	1,479	2	1.35			1		1															1		1										1
Putnam —																																			
Monterey	1,342	4	2.98			1						1								1		1	2	1				1							2
Pleasant	1,466	12	8.12		5	1					1									4		1											1		
Richland —																																			
Blooming Grove	978	4	4.09																	1		1	3	2											
Cass	720	9	12.50	1		2						1								1			6						1			2			
Jackson	841	7	8.32																	1	1		5	1					2					1	
Mifflin	800	5	6.25																				4						1				1		
Monroe	1,224	4	3.17			2	2													2	1	1													
Plymouth	736	4	5.43																				4	1					1						
Sandusky	598	4	6.69																	1		1	1	1									2		
Springfield	1,373	9	9.60			2												2		1		1	1		1										

Ross —																																			
Concord	2,240	23	10.27	4	4	5	....	....	....	....	1	....	....	....	....	....	....	....	....	2	1	1	15	....	....	....	1	....	4	....	....	3	....	1	....
Paint	1,068	5	4.68	2	....	2	....	2	....	....	....	....	....	....	....	....	....	....	....	1	....	1	2	....	1	....	....	....	....	....	....	....	....	....	....
Twin	1,899	4	2.11	....	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	2	....	1	1	....	1	....	....	....	....	....	....	....	....	....	....
Union	2,317	1	.43	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	....
Sandusky —																																			
Jackson	1,600	4	2.50	1	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	2	....	2	....	....	....	....	....	....	....	....	....	....	....	1	....
Sandusky	1,842	15	8.14	....	....	2	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Townsend	1,567	6	3.83	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	2	....	1	3	....	....	....	....	....	1	....	....	2	....	....	....
Scioto —																																			
Bloom	1,718	7	4.07	1	1	4	3	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	4	....	....	....	1	1	1	....	....	1	....	....	5
Clay	1,764	5	2.83	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	1	....	....	....	....	....	....	....	....	....	....	....	2	....
Jefferson	915	11	12.02	3	....	3	....	....	....	....	....	....	....	1	....	....	....	....	....	2	....	2	5	....	....	....	....	....	....	....	....	2	....	1	....
Morgan	1,035	15	14.49	1	2	5	....	1	1	....	....	....	....	....	1	....	....	2	....	3	....	3	6	1	....	....	....	....	1	....	1	1	....	1	....
Porter	2,500	47	18.80	....	....	8	1	....	....	....	....	....	....	....	....	....	....	7	....	18	2	16	15	....	1	....	....	....	3	....	....	4	1	5	....
Seneca —																																			
Big Spring	1,618	8	4.94	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	4	....	2	3	1	....	....	....	....	....	....	....	....	....	....	....
Liberty	1,459	1	.68	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Pleasant	1,447	1	.69	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Scipio	965	1	1.04	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	1	....	....	....	....	....	....
Seneca	1,326	9	6.79	....	....	2	1	....	....	....	....	....	....	....	....	....	....	1	....	6	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
Thompson	1,545	8	5.18	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	2	5	....	....	....	....	....	2	....	....	....	....	....	....
Venice	1,290	36	27.91	5	6	12	....	2	1	....	3	....	....	....	2	1	....	3	....	5	1	4	19	....	....	....	4	....	5	....	....	10	....	....	....
Shelby —																																			
Loramie	1,528	12	7.85	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	2	1	....	....	....	....	....	....	....	....	1	....	....	....
Turtle Creek	1,163	10	8.60	....	....	2	....	1	....	....	....	....	....	....	....	....	....	1	....	2	....	2	6	....	2	....	....	....	1	....	....	1	....	....	2
Washington	623	3	4.81	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	1	....	....	....	1	....	....	....	....	....	....
Stark —																																			
Jackson	2,090	23	11.00	1	4	5	....	....	....	....	....	....	....	....	....	....	....	3	....	7	....	3	7	1	....	....	....	....	6	....	....	....	....	4	1
Lake	2,312	19	8.22	3	2	6	2	....	....	....	....	....	....	....	....	2	....	1	....	....	....	....	13	4	....	....	....	....	3	....	....	1	....	....	2
Lawrence	2,972	19	6.39	5	3	1	1	....	....	....	....	....	....	....	....	....	....	....	....	6	2	4	11	....	3	....	2	....	4	....	....	2	....	1	2
Nimishillen	1,839	28	15.23	1	3	9	....	2	....	....	....	....	....	....	....	....	....	....	....	5	2	3	13	4	....	....	....	1	4	....	....	2	....	....	1
Osnaburg	1,608	9	5.60	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4	1	....	4	....	....	....	....	1	....	2	....	1	....	1	....
Paris	1,727	8	4.63	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	5	....	....	....	1	....	1	....	....	1	2	....	....
Pike	1,491	17	11.40	1	1	3	1	....	....	....	....	....	....	....	....	....	....	2	....	2	....	2	4	....	....	....	....	....	2	....	....	2	....	....	....
Plain	3,624	13	3.59	....	....	5	....	....	....	....	....	....	....	....	....	....	....	5	....	....	....	....	8	2	1	....	....	....	3	....	....	2	....	....	....
Sandy	639	2	3.13	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sugar Creek	1,836	1	.54	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Tuscarawas	4,139	21	5.07	3	2	1	....	1	....	....	....	....	....	....	....	....	....	....	....	8	1	4	10	4	....	....	2	....	2	....	....	3	1	1	2
Summit —																																			
Coventry	1,790	6	3.35	1	....	4	....	....	....	....	....	....	....	....	1	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....
Franklin	2,024	21	10.38	....	2	2	1	....	1	....	....	....	....	....	....	....	....	....	....	5	....	5	6	1	....	1	....	....	....	....	....	....	7	1	....
Hudson	657	9	13.70	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	2	7	....	1	....	....	....	2	....	....	3	....	....	....
Northampton	814	7	8.60	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	5	....	....	....	....	....	3	....	....	....	....	....	....
Richfield	930	14	15.05	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	2	1	1	3	1	1	....	....	....	1	....	....	....	....	1	....
Twinsburg	805	8	9.94	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	1	1	5	....	....	....	....	....	1	....	....	....	....	1	....

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING THE YEAR 1901 — Continued.

497 Townships. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Trumbull —																																			
Bazetta	706	9	12.75			1																	6							1		2		1	
Braceville	867	10	11.53			1						1								5	1	2	2	1								2		2	5
Bristol	1,035	5	4.83																	1	1		4									2			
Champion	732	6	8.19			1	1													2			3					1				2			
Farmington	723	13	17.98			4												2		1			7						2	1		4		1	
Fowler	764	10	13.09			1						1											8						1			4	1		
Gustavus	844	12	14.22	1	3	1												1		2	2		9						2			7			
Johnston	753	15	19.92																	2	2		3						2			1	7	3	
Lordstown	722	4	5.54																				2						1			1	1	1	
Mecca	789	7	8.87	1																			6	2					2	1					
Vienna	942	14	14.86		2	4		2										1		1		1	9	3								1			
Tuscarawas —																																			
Auburn	984	10	10.16																	2		2	8		1			1	2		1	2			
Franklin	962	32	33.26	6	3	18	6	3			1				1			7		4	1	3	8	2	1		1		1			1		2	6
Jefferson	928	15	16.16			1			1														9	1	1		2		2			1			6
Mill	549	6	10.93			1														1	1		3	1					1			1	1		
Salem	1,118	9	8.05	1	1	4	1		1											3	2	1	2						2						4
Union	825	5	6.06			3		1											1				2						2						
Warren	796	5	6.28																	2	1	1													2
Warwick	1,632	6	3.67	2	2															2															
York	1,027	2	1.95			2										2																			1
Union —																																			
Allen	957	8	8.36	1		1		1															7				1		2	1		3			
Claibourne	1,401	19	13.56	4	2	4		4												8	1	6	6	1	1				1					1	
Dover	893	13	14.56		2	2							1						1	5		3	1		1								2	1	2
Jerome	1,307	2	1.53			2			1										1																
Leesburg	1,170	16	13.68			6		1	2									1	2	4	2	2	6	1	1				4						
Taylor	1,156	4	3.37			2												1	1				2						1			1			
Washington	1,186	6	5.06			2						2								2		2	2					2							2
Van Wert —																																			
Jennings	1,338	8	5.98			3	1	2												3	1	1	2						2						
Tully	1,736	15	8.64	1		2												2		7		5	6		2				2	1					

Vinton —																																			
Brown	746	2	2.68																				2		1				1						
Eagle	1,073	10	9.32	2		2												2		2		1	4	1					1			2			
Jackson	1,156	4	3.46																	1		1	3		1							1			
Knox	953	3	4.87			2												2					1						1						
Warren —																																			
Clear Creek	1,987	15	7.55	4	4															6	1	3	5	1				2	1						
Deerfield	1,791	13	7.26	5	1	3		1										2					7	1								1			3
Hamilton	1,703	16	9.39			1							1							3	1	1	11					3	1			1	6	1	
Harlan	1,650	8	4.85			2			1									1					6				1		1			1			
Union	555	12	21.62	1	2															2	1	1	8				2	1	2	1		1			2
Washington —																																			
Belpre	2,761	20	7.25	1	2	4	1					1	2							3		3	5						3	1		1			
Dunham	1,021	1	.98			1																													
Fairfield	758	12	15.82			2												2		4		1	4	2					2					1	
Marietta	2,416	45	18.63			2												2																	
Salem	1,310	8	6.11																	3			3		1				1			1		2	
Warren	1,813	16	8.83	1		5	1		1			1						2		3			8	1		1	1		3						1
Wesley	1,323	4	3.02			2	1		1														1						1					1	3
Wayne —																																			
Chippewa	1,818	15	8.25			3	1			1								1		4	2	1	8	1					3	2		2			
Clinton	985	2	2.03			2	2																												
Congress	198	15	75.75			2	1											1		6	1	2	7		2							5			
East Union	1,418	20	14.10	1		5	1		1									3		8		1	2									2			
Franklin	1,202	1	.83																															1	1
Milton	1,978	6	3.03	2		1																	5	2								1			
Paint	1,014	12	11.49			6	3	1										1	1				6	1			1		2			2			7
Plain	1,666	1	.60			1												1																	
Salt Creek	1,045	4	3.82			1												1		2	1	1	1		1										
Wayne	1,717	6	3.48			2												2					4	1					3						
Williams —																																			
Millcreek	1,485	5	3.37		1	1												1					2									1		1	
Madison	1,201	3	2.50	1																2															
St. Joseph	1,090	14	12.84	2	1	2														2			1									1			
Wood —																																			
Freedom	1,184	5	4.22			1	1																4					2	1			1			
Grand Rapids	438	5	11.42	2																			3	1	1	1									
Jackson	1,418	8	5.52	1		1										1							7				1		2						
Liberty	2,870	11	3.79	2	2	6	3											3		1		1	2									2		1	1
Middletown	1,757	13	7.40		2	1										1				6		6	5							2			1		3
Plain	1,120	1	.89			1					1																								
Portage	2,293	1	.44			1	1																												
Ross	1,133	4	3.53	1		1			1														3						2			1			1
Troy	1,940	3	1.55			3													1																
Weston	659	25	37.94			4		1				2								2	2		7		1			1	3	2					
Wyandot —																																			
Eden	1,176	6	5.10			3							1					1		3		3													
Pitt	992	1	1.01																			1							1						
Salem	1,190	4	3.36																	8		1	1						1						
Total	618,354	4,655	7.18	313	215	927	184	143	63	5	22	46	12	11	24	42	5	212	24	897	187	466	1,935	210	171	35	75	72	468	55	8	429	118	188	230

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING THE YEAR 1901 — Concluded.

Cities, Villages and Townships. Census 1900.	Population.	Total Deaths.	Annual rate per 1,000.	Total under one year.	Total under five years and over one year.	Total Zymotic diseases.	Croup and Diphtheria.	Cholera Infantum.	Cerbro Spinal-Meningitis.	Cholera Morbus.	Diarrheal diseases.	Dysentery.	Malarial Fever.	Measles.	Puerperal Fever.	Scarlet Fever.	Tonsilitis.	Typhoid Fever.	Whooping Cough.	Total Constitutional Diseases.	Cancer	Phthisis Pulmonalis.	Total Local Diseases.	Apoplexy.	Bright's Disease.	Bronchitis.	Convulsions.	Gastritis and Peritonitis.	Heart Disease.	Meningitis.	Pleurisy.	Pneumonia.	Total Developmental Diseases.	Total Violence.	Premature and Still Births.
Cities over 5,000 population	1,739,757	25,364	14.58	4210	2038	4190	544	596	150	38	526	190	43	101	54	135	12	771	92	4528	998	2697	12002	922	925	562	770	594	1952	710	53	2408	2395	1597	1869
Villages (268)......	349,393	4,458	12.76	345	216	739	83	120	49	11	24	29	13	7	18	47	4	160	21	845	172	469	1913	200	174	50	66	114	451	75	15	389	154	212	244
Townships (497)...	648,354	4,655	7.18	313	215	927	184	143	63	5	22	46	12	11	24	42	5	212	24	897	187	466	1935	210	171	35	75	72	468	55	8	429	118	188	236
Total	2,737,504	34,477	12.59	4868	2469	5856	811	859	262	54	572	265	68	119	96	224	21	1143	137	6270	1357	3632	15850	1332	1270	647	911	780	2871	840	76	3226	2667	1997	2349

SUMMARY OF MORTALITY REPORTS.

The total number of deaths reported from all causes — excluding premature and still-births — by the cities, villages and townships represented in the following tables was 34,477. The average population of the cities, villages and townships represented (Census 1900) was 2,737,504 which is equal to an annual death rate of 12.59 per thousand living population represented.

The deaths in 2,760,656 living population (Census 1900) in 1900 were 34,296, equal to an annual death rate of 12.66 per thousand; while in 1899 the total number of deaths reported in 2,760,720 population (estimated) was 32,309, equal to a mortality rate of 11.70 per thousand.

DEATHS OF CHILDREN UNDER FIVE YEARS OF AGE.

The number of deaths reported of children under five years of age (premature and still-born excluded) was 7,337, which is equal to 21.28 per cent of the deaths from all causes, and a death rate of 2.7 per thousand population represented. The death rate of children under five the preceding year was 2.5 per thousand population represented.

ZYMOTIC DISEASES.

The total number of deaths reported from zymotic diseases was 5,856, which is equal to 16.9 per cent of the deaths reported from all causes, and an annual rate of 2.1 per thousand of the population represented.

The number of deaths reported the preceding year from zymotic diseases was 6,299, equal to a death rate of 2.3 per thousand population represented.

CROUP AND DIPHTHERIA.

The total number of deaths reported from croup and diphtheria was 811, which is equal to 2.3 per cent of the deaths reported from all causes, and a death rate of .29 per thousand of the population represented.

The number of deaths reported the preceding year from these causes was 983, equal to a mortality rate of .35 per thousand of the population represented.

CHOLERA INFANTUM, CHOLERA MORBUS AND DIARRHŒA.

The total number of deaths reported from cholera infantum, cholera morbus and diarrhœa was 1,485, which is equal to 4.3 per cent of the deaths reported from all causes, and a mortality rate of .5 per thousand population represented.

The number of deaths reported the preceding year from these causes was 1,389, which is equal to a mortality rate of .5 per thousand of the population represented.

MEASLES, SCARLET FEVER AND WHOOPING COUGH.

The total number of deaths reported from measles, scarlet fever and whooping cough was 480, which is equal to 1.4 per cent of the total number of deaths reported from all causes, and a mortality rate of .18 per thousand of the population represented.

The total number of deaths reported from these diseases during the preceding year was 499, equal to a mortality rate of .18 per thousand population represented.

TYPHOID FEVER.

The total number of deaths reported from typhoid fever was 1143, which is equal to 3.3 per cent of the total number reported from all causes, and a mortality rate of .42 per thousand population represented.

The number of deaths reported from this cause the preceding year was 1,291, equal to a mortality rate of .47 per thousand living population represented.

CONSTITUTIONAL DISEASES.

The total number of deaths reported from constitutional diseases was 6,270, which is equal to 18.2 per cent of the deaths reported from all causes, and a mortality rate of 2.3 per thousand population represented.

The number of deaths reported from constitutional diseases the preceding year was 6,228, equal to a mortality rate of 2.2 per thousand population represented.

CANCER.

The total number of deaths reported from cancer was 1,357, which is equal to 3.3 per cent of the deaths reported from all causes, and a mortality rate of .49 per thousand population represented.

The number of deaths reported from this cause the preceding year was 1,139, equal to a mortality rate of .4 per thousand population represented.

CONSUMPTION.

The total number of deaths reported from consumption was 3,632, which is equal to 10.5 per cent of the deaths reported from all causes, and a mortality rate of 1.32 per thousand population represented.

The number of deaths reported from this cause the preceding year was 3,241, equal to a mortality rate of 1.18 per thousand population represented.

LOCAL DISEASES.

The total number of deaths reported for all local diseases was 15,850, which is equal to 45.9 per cent of the deaths reported from all causes, and a mortality rate of 5.8 per thousand population represented.

The number of deaths reported from all local diseases the preceding year was 15,912, equal to a mortality rate of 5.8 per thousand population represented.

BRONCHITIS, PLEURISY AND PNEUMONIA.

The total number of deaths reported from bronchitis, pleurisy and pneumonia was 3,949, which is equal to 11.5 per cent of the deaths reported from all causes, and a mortality rate of 1.5 per thousand of the population represented.

In the preceding year there were 3,682 deaths reported from these causes, equal to a mortality rate of 1.4 per thousand population represented.

CONVULSIONS AND MENINGITIS.

The total number of deaths reported from convulsions and meningitis was 1,751, which is equal to 5.1 per cent of the deaths reported from all causes, and a mortality rate of .64 per thousand population represented.

The number of deaths reported from these diseases the preceding year was 1,856, equal to a mortality rate of .67 per thousand population represented.

DEVELOPMENTAL DISEASES.

The total number of deaths from developmental diseases reported (excluding premature and still-births) was 2,667, which is equal to 7.7 per cent of the deaths reported from all causes, and a mortality rate of .98 per thousand population represented.

During the preceding year there were 2,705 deaths reported from developmental diseases, equal to a mortality rate of .98 per thousand population represented.

VIOLENCE.

The total number of deaths reported from violence was 1,997, which is equal to 5.0 per cent of the deaths reported from all causes, and a mortality rate of .7 per thousand population represented.

During the preceding year there were 1,675 deaths reported from violence, equal to a mortality rate of .6 per thousand population represented.

PREMATURE AND STILL-BIRTHS.

The total number of premature and still-births reported was 2,349, which is equal to 6.8 per cent of the deaths reported from all causes, and a rate of .86 per thousand population represented.

During the preceding year there were 2,255 premature and still-births reported, equal to a rate of .82 per thousand population represented.

APPENDIX.

FIFTH REPORT OF AN INVESTIGATION

OF

THE RIVERS OF OHIO

AS SOURCES OF PUBLIC WATER SUPPLIES.

BY THE OHIO STATE BOARD OF HEALTH.

1902.

FIFTH REPORT UPON THE EXAMINATION OF SOURCES OF PUBLIC WATER SUPPLIES.

In 1897 the Board began an investigation of the rivers of the state, and other sources of public water supplies. The first report dealt with the Scioto, Olentangy and Mahoning rivers, and also contained a report upon the "Rock Waters and Flowing Wells of Ohio," by the late Dr. Edward Orton, State Geologist.

The second report took up the Sandusky and Maumee Rivers. It also contained a supplemental report upon the condition of Public Water Supplies of Ohio by Mr. B. H. Flynn, Engineer to the State Board of Health. This report was made necessary by the provisions of an act requiring the Board to report annually upon the conditions of all public water supplies. It was necessarily of a preliminary character.

In the third report the condition of the Muskingum River and its tributaries received attention.

The fourth report dealt with the conditions affecting the two Miami rivers. With the exception of a few comparatively short small streams, this includes all the interior streams of the state.

The present report deals with the public water supplies obtained from the Ohio River and Lake Erie. The character of this investigation was necessarily different. For the other streams a somewhat comprehensive report was made of the source, character and amount of various pollutions received by them. It was impractical to take up this inquiry for the Ohio River and Lake Erie, except local sources of pollution affecting public water supplies in Ohio.

No studies were made of the water supplies of Cincinnati or Cleveland. Both cities are making extensive changes in their water supply, and it would have been futile to have reported upon their present supply. No report was made upon the supplies of Lakeside, Lorain, or Sandusky, as these supplies were considered in the report for 1899.

The investigation indicates for the Ohio River that it at no place offers a safe domestic supply during the entire year. Its waters are improved but scarcely made safe by sedimentation. The low alkalinity, at times, will make it necessary to use much care in the use of coagulants (alum) in the purification of the water by mechanical filtration. In the interest of public health early attention should be given to the proper purification of all public water supplies obtained from this stream.

The investigation shows that the waters of Lake Erie, near to cities and villages that pour sewage into them, are subject to pollution and an unsafe source for domestic supply. Cities have felt safe in locating sewer outlets east of the water intake, depending upon the natural eastward current to cut off sewage contamination. Investigations have shown the great inconstancy of lake currents, which depend largely upon the direction of the wind, and sewage laden water is often driven far to the westward. Cleveland will discharge its sewage ten miles east of its water intake. It remains to be seen whether this will at all times protect the water supply against pollution.

Lake Erie is a shallow body of water. In times of storms the wave action stirs up the lake bottom and muddies its waters many miles from shore. It is not only desirable that public water supplies should be pure; they should also be clear and free from sediment. It is probably not too much to say that filtration is absolutely necessary to obtain from Lake Erie at all times an entirely satisfactory water supply. Lorain and Conneaut, after having been severely scourged by typhoid fever from the use of raw lake water, have introduced filters. Other lake cities will doubtless, sooner or later, be obliged to follow their example.

The report also contains a report (the second) upon the condition of the public water supplies of Ohio. This report deals more particularly with cities and villages using ground water as a source of supply. In the first report cities and villages using surface water were specially considered. It is the water supplies of surface origin that need to be kept under observation. Our large cities, with few exceptions, must forever depend upon lakes and streams for a water supply. The investigations of the Board show the extent to which these are already polluted. The pollution of our streams is rapidly increasing. Their minimum flow is decreasing, and to the same extent their ability to dispose by natural agencies of the sewage and other pollution poured into them. Our cities must more and more turn to water purification. But even then, unless efficient measures are taken to conserve the streams, many of them will become open sewers, breeding sickness along their course, and unfitted for the use of man or beast.

REPORT UPON A PRELIMINARY INVESTIGATION OF THE OHIO RIVER AND LAKE ERIE, WITH THEIR PUBLIC WATER SUPPLIES.

By Elmer G. Horton, B. S.,
BACTERIOLOGIST AND CHEMIST, OHIO STATE BOARD OF HEALTH.

SYNOPSIS.

I. OHIO RIVER.
- INTRODUCTION.
- SCOPE OF WORK.
- METHODS.
- SAMPLES.
- RAINFALL DATA.
- INFLUENCE OF TRIBUTARIES.
- RESULTS OF ANALYSES.
  - ANALYTICAL TABLES.
  - LIST OF PLATES.
  - PLATES.
- DISCUSSION OF RESULTS.
  - CHARACTER OF OHIO RIVER.
  - UNTREATED SUPPLIES.
  - SUBSIDED SUPPLIES.
  - FILTERED SUPPLIES.
- SUMMARY.
- CONCLUSIONS.

II. LAKE ERIE.
- INTRODUCTION.
- SAMPLES.
- RESULTS OF ANALYSES.
  - TABLES.
  - PLATES.
- DISCUSSION OF RESULTS.
- SUMMARY.
- CONCLUSIONS.

INTRODUCTION.

During the years 1897 to 1900 inclusive studies have been carried on by the State Board of Health to learn the sanitary condition of the streams of Ohio. It was decided to continue the work along the Ohio River and Lake Erie during the year 1901. As these bodies of water are on the border of the state they are not subject to the same legislation as the interior waters, and the nature of the work was accordingly modified from that of the preceding years to meet the altered condition.

SCOPE OF WORK.

The plan consisted of bacteriological and chemical examinations of a series of samples, taken at irregular intervals of time, from each Ohio public water supply* where water is derived from the Ohio River. In addition samples of the river water were taken each time at or near the intake pipe, except in the cases of Wellsville, Martins Ferry, Ironton and Portsmouth, which cities attempt no purification of the water, but use it just as it comes. At Bellaire the river sample was discontinued after a few trials, since practically no purification is accomplished there. The investigation covered the period from April to December inclusive, 1901.

Covering such a wide field the work is, of course, somewhat preliminary in character, yet so much valuable information has been obtained that it would certainly be unwise not to put it in permanent form, and thus render it available for use. It has been our desire in this preliminary survey not only to learn the quality of the water delivered to the consumers in these various cities, but also to obtain information as to the efficiency of the different methods now actually employed in our state for the treatment of Ohio River water. Such preliminary information in connection with the valuable and thorough work already done by Fuller at Louisville and Cincinnati, and by the Filtration Commission at Pittsburg, may be of much value to cities and villages now treating the Ohio River water, or desiring in the near future to prepare it for suitable and general use.

In view of the limited amount of ground water available, and the high mineral character of the same with its consequent hardness, it appears the use of ground waters will be limited to the smaller communities, while at least the larger cities along our southern border will turn to the river for an abundant supply of soft water. As the present quality of the Ohio River is not likely to improve and may continue to show increased pollution, purification will be a necessary step wherever a community seeks this stream as a source of water supply.

METHODS.

The methods of analytical work have continued as in preceding work, but in accordance with the recommendation of the committee on Standard Methods of Water Analysis, A. P. H. A., the results for color have been expressed as parts per million, and for turbidity in terms of silica. The turbidity readings were originally made with the wire method and expressed in terms of the reciprocal scale. The conversions to the silica standard were made by Whipple's table [Tech. Quar. September, 1900, p. 285]. It will be noticed that some of the turbidities were excessive, and no claim is made that these high turbidities are accurate. It is known they are not correct as they had to be obtained by dilutions — causing error with the wire method. Such dilutions were made as necessary to enable the wire to be seen at a depth of not less than one inch. These results are recorded, however, in order that the great turbidity of the Ohio in certain portions of its course may be more fully realized.

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* Except Cincinnati.

SAMPLES.

The first set of samples at each place was collected by the writer, and, at the same time, a representative of the local board of health was instructed how to properly collect subsequent samples. The collections other than the first were made through the kindness of the local board of health. To these boards and to the individuals making the collection we wish to here express our thanks for the interest taken by them and the valuable assistance rendered by them. As soon as taken, samples were shipped directly to Columbus where the examinations were commenced without delay.

Collections were made at the following fourteen places; the number of samples, the name of the collector or collectors and the approximate distance in miles by river of the city or village from East Liverpool are also given.

Place.	Approximate distance from East Liverpool.	No. of Samples	Name of Collector.
East Liverpool	....	15	J. H. Burgess
Wellsville	3	9	Joseph Warren.
Toronto	14	8	S. V. Ault.
Steubenville	21	13	* John Welch.
Mingo Junction	23	10	F. S. Buchanan.
Martins Ferry	42	6	Dr. J. W. Darrah.
Bellaire	47	11	Dr. D. W. Boone.
Marietta	121	16	Dr. J. B. McClure.
Pomeroy	193	24	Dr. R. E. Stobart.
Gallipolis	212	14	Wm Watts.
Ironton	267	5	Fred G. Leete or Dr. J. W. Lowry.
Portsmouth	296	5	Dr. L. A. Vernier.
Ripley	353	6	Mr. G. M. Robb.
New Richmond	386	12	Dr. J. A. Windsor.

* The first samples of river water at Steubenville were collected by Mr. S. B. Curfman to whom our thanks are also due for a special sample as mentioned later.

Thus it is seen there were 154 samples examined. As previously noted no river samples were taken at Wellsville, Martins Ferry, Ironton and Portsmouth since no purification of the water is attempted at those places. No studies were made in connection with the supply at Cincinnati because of the extensive and thorough work already done there by Fuller, and because that city is proceeding to make changes in their supply.

The samples from April to August were taken on or near specified dates, but then the collectors were requested to obtain samples representative of varying conditions from good to bad.

RAINFALL DATA.

In considering the influences of rains upon the work of the year, the records of the United States Weather Bureau were much used through the kindness of Mr. J. Warren Smith, Director of Ohio Section. There is no desire to burden the report with more than the merest mention of the data obtained. We here give the total annual precipitation for the year 1901 at the weather bureau stations located on the portion of the river under study. Oil City and Pittsburg are included as representative of influences above East Liverpool. The departure from the normal annual rainfall for each station is indicated, the deficiencies being marked —; the excesses +. Point Pleasant is nearly opposite Gallipolis, and Hanging Rock is near Ironton.

Name of Station.	Annual Precipitation.	Departure from Normal
Oil City, Pa	47.95	+7.53
Pittsburgh, Pa	40.76	+4.01
Wheeling, W. Va	38.70	—0.03
Marietta, O	38.22	—4.38.
Parkersburg, W. Va	35.14	—6.73
Pomeroy, O	30.22	—1.83
Pt. Pleasant, W. Va	37.72	—1.61
Catlettsburg, Ky	29.34	—5.84
Hanging Rock, O	34.84	—8.56
Portsmouth, O	39.73	—2.50
Ripley, O	26.48	—15.81
New Richmond, O	24.80	....

This gives an average deficiency of 3.25 inches for the eleven stations at which normals have been established, or omitting the Pennsylvania stations of 5.25 inches for the places under study. This shows a dry year for the lower portion of the Ohio and extremely so in the western portion. The annual precipitation at Cincinnati was only 17.99 with a deficiency of 20.52 inches. In contrast with this deficiency in the lower course of the Ohio is contrasted the excess in the upper course. Of eighteen weather bureau stations in Pennsylvania located on the area drained by the Ohio

River, sixteen reported annual excesses varying from 0.04 to 12.43 inches, making the average annual excess for the eighteen stations a little over 4 inches.

The monthly departures from the normal are greater than usual, showing an uneven distribution of the rainfall. The greatest deficiencies occurred in July, October and November with the heavier excesses in April, June and December. It was a very wet June.

This weather information shows the upper portion of the river represented but a trifle more than a normal rain influence, while in the lower course the rain influence was from 12 to 14 per cent below the normal and not well distributed.

RELATION OF TRIBUTARIES.

The relation of the various larger tributaries to the main stream is shown by the map given elsewhere in this volume under the report of the Engineer of the Board.

RESULTS OF ANALYSES.

The analytical results are submitted in tabulated form, the cities and villages being arranged in three groups according to the method of treating the water, as follows:

A. Untreated Waters — Wellsville, Martins Ferry, Bellaire, Ironton, and Portsmouth.

B. Subsidence — East Liverpool, Toronto, Steubenville, Marietta, and New Richmond.

C. Filtration — Mingo Junction, Pomeroy, Gallipolis, and Ripley.[1]

Following the tables we give a series of plates on which some of the analytical findings are graphically reproduced by curves. The first series is for the river as a whole, giving the results by months when samples were collected at the same time and giving also the average finding of all the examinations at each place. Later there are given the findings for each individual place by successive samples. In all of the plates the unbroken line represents river water and the dotted line hydrant water. The difference between the broken and unbroken line represents the purification attained, hence the lines merge where no purification is obtained.

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[1] Ripley is included here for convenience but is supplied with ground, not river water.

RECORD OF CHEMICAL AND BACTERIOLOGICAL EXAMINA-

UNTREATED SUPPLIES. (Parts per

Sample Number.	Locality of Sample.	Date Collected.	Color.	Turbidity.	Sediment.	Odor.
1640	Wellsville, hydrant....	April 16, 1901	29	96	c	2 earthy
1712	" "	June 24, 1901	20	*c* 948	c	3 earthy
1770	" "	July 17, 1901	45	58	dec	3 veg.
1821	"	Aug. 12, 1901	32	slight	s	2 musty
1858	" "	Aug. 31, 1901	36	101	dec	3 earthy
1870	" "	Sept. 6, 1901	45	*d* 1100	m	3 earthy
1878	" "	Sept. 13, 1901	40	173	dec	2 veg.
1922	" "	Oct. 11, 1901	35	slight	s	3 veg.
2010	" "	Dec. 11, 1901	35	78	dec	3 earthy
	AVERAGE	....	35	284	......	....
1646	Martins Ferry, hydrant	April 17, 1901	28	46	c	2 earthy
1716	" "	June 24, 1901	22	*c* 567	c	3 earthy
1771	" "	July 17, 1901	35	58	dec	3 veg.
1822	" "	Aug. 12, 1901	28	very slight	s	3 veg.
1925	" "	Oct. 14, 1901	30	29	s	none
2013	" "	Dec. 11, 1901	38	58	s	2 earthy
	AVERAGE	....	30	126	.....	....
1647	Bellaire, river	April 18, 1901	28	63	c	2 veg.
1717	" "	June 24, 1901	22	*c* 711	c	3 earthy
1772	" "	July 17, 1901	35	73	c	3 veg.
1648	Bellaire, hydrant	April 18, 1901	28	46	c	2 veg.
1718	" "	June 24, 1901	22	*c* 603	c	3 veg.
1773	" "	July 17, 1901	40	73	c	3 veg.
1814	" "	Aug. 10, 1901	32	54	dec	3 veg.
1861	" "	Sept. 2, 1901	30	358	c	3 earthy
1879	" "	Sept. 12, 1901	42	106	dec	2 veg.
1904	" "	Oct. 8, 1901	24	slight	s	3 veg.
2007	" "	Dec. 10, 1901	40	83	dec	3 veg.
	AVERAGE	....	32	165	......	....
1677	Ironton, hydrant	May 16, 1901	24	562	c	3 earthy
1783	" "	July 23, 1901	35	*d* 1632	m	3 earthy
1857	" "	Aug. 30, 1901	30	470	c	3 musty
1991	" "	Nov. 21, 1901	35	111	s	3 earthy
2018	" "	Dec. 12, 1901	50	302	c	3 earthy
	AVERAGE	....	35	615	......	....

REFERENCES: Turbidities obtained by dilution: c, 1 to 3; d, 1 to 4; e, 1 to 5; f, 1 to 6; h, 1 to 8; l, 1 to 12; r, 1 to 18. Odors: 1, very faint; 2 faint; 3, distinct; 4, decided; 5, strong; t, trace; v. s. very slight; veg., vegetative; u, undetermined; s, slight; dec., decided; c, considerable; m, much.

TIONS OF PUBLIC WATER SUPPLIES FROM OHIO RIVER.

Million.) UNTREATED SUPPLIES.

Oxygen Required.	Nitrogen as				Chlorine.	Alkalinity.	Incrusting Constituents.	Total Solids.	Loss on Ignition.	Suspended Solids.	Bacteria per c.c.	Colon Present.
	Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.								
3.98	.134	.018	.006	1.04	13.6	11	35	197	42	120	2300	+
9.48	.494	.038	T	T	14.6	23	......	712	72	575	lost	—
3.89	.222	.018	T	.22	22.7	29	......	222	77	43	3900	+
3.67	.178	.007	.003	T	30.5	37	......	231	66	5	450	—
5.41	.222	.070	.002	T	11.8	27	......	176	33	u	11200	—
14.93	.528	.042	.000	T	13.1	32	......	1228	....	1083	700	—
5.80	.201	.017	T	.05	19.3	25	......	276	....	108	8700	—
4.27	.168	.058	T	T	19.8	32	......	169	....	u slight	2600	+
5.53	.286	.086	T	.03	14.8	19	......	153	....	36	7700	+
6.33	.269	.039	.001	.15	17.8	26	......	374	....	246	4700	..
2.38	.140	.018	006	.16	9.8	22	53	171	43	59	1200	+
5.56	.298	.030	T	T	17.0	36	......	375	89	217	6500	+
3.74	.228	.027	T	.20	19.0	34	......	234	77	57	1100	—
4.39	.145	.008	.000	.06	31.4	43	......	217	71	3	2200	—
5.36	.242	.028	.002	T	23.3	36	......	188	....	u slight	550	+
5.78	1.850	.052	.000	.07	10.6	20	......	143	....	35	10200	+
4.54	.484	.027	.001	.08	18.5	32	......	221	....	62	3600	..
3.70	.146	.010	.004	T	6.6	19	38	177	38	65	2500	+
5.72	.312	.074	.004	T	15.2	30	......	408	83	258	9700	+
4.23	.242	.038	.005	.23	19.9	34	......	251	80	u	6200	u
2.57	.108	.064	.007	T	8.2	25	42	177	43	55	1500	+
5.64	.314	.040	.004	T	18.8	35	......	378	91	204	5200	+
4.27	.262	.042	.005	.23	19.0	36	......	270	83	58	2800	+
4.15	.180	.008	.002	.22	32.0	44	......	250	71	u	1400	—
6.95	.216	.011	T	T	13.6	36	......	389	....	208	9600	—
6.61	.245	.011	.000	.05	16.2	33	......	252	....	73	4100	—
4.44	.154	.070	.001	.10	22.2	37	......	209	....	u slight	1100	—
6.07	.278	.034	T	.04	10.0	17	......	140	....	28	10500	+
5.09	.220	.035	.002	.08	17.5	35	......	258	....	90	4500	..
6.18	.278	.006	.005	T	11.1	22	43	412	51	279	4900	+
6.97	.376	.006	.001	.05	16.0	38	......	719	138	572	1600	—
10.25	.322	.030	.000	T	18.4	31	......	453	51	u	4700	+
3.47	.164	.082	.003	T	38.3	50	......	292	....	42	1500	—
9.96	.404	.060	T	.05	14.6	19	......	491	....	376	7200	+
7.37	.309	.037	.002	.02	19.7	32	......	473	....	317	4000	..

RECORD OF CHEMICAL AND BACTERIOLOGICAL EXAMINATIONS

UNTREATED SUPPLIES. (Parts per

Sample Number.	Locality of Sample.	Date Collected.	Color.	Turbidity.	Sediment.	Odor.
1679	Portsmouth, hydrant...	May 17, 1901	4	1084	c	earthy
1726	“ “ ...	June 27, 1901	40	*r* 13068	m	earthy
1788	“ “ ...	July 23, 1901	50	*h* 2248	m	earthy
1842	“ “ ...	Aug. 19, 1901	33	*e* 890	c	earthy
2009	“ “ ...	Dec. 10, 1901	40	153	c	earthy
	AVERAGE	....	37	3489	......	....

SUBSIDED SUPPLIES.

Sample Number.	Locality of Sample.	Date Collected.	Color.	Turbidity.	Sediment.	Odor.
1638	East Liverpool, river...	April 16, 1901	29	126	c	2 earthy
1720	“ “ ...	June 25, 1901	28	249	c	earthy
1779	“ “ ...	July 17, 1901	43	78	dec	veg.
1823	“ “ ...	Aug. 12, 1901	28	*u* slight	s	veg.
1867	“ “ ...	Sept. 4, 1901	36	207	dec	3 earthy
1875	“ “ ...	Sept. 11, 1901	36	96	dec	2 veg.
1902	“ “ ...	Oct. 7, 1901	35	*u* slight	s	veg.
	AVERAGE	....	34	108	.....	....
1639	East Liverpool, hydrant	April 16, 1901	39	83	s	2 earthy
1719	“ “	June 25, 1901	23	207	c	veg. & earthy
1780	“ “	July 17, 1901	25	46	s	2 veg.
1824	“ “	Aug. 12,1901	50	very slight	v. s.	2 veg.
1868	“ “	Sept. 4, 1901	37	389	dec	earthy
1876	“ “	Sept. 11, 1901	39	73	dec	2 veg.
1903	“ “	Oct. 7, 1901	28	slight	s	veg.
2008	“ “	Dec. 10, 1901	50	92	dec	veg.
	AVERAGE	....	35	111	......	....
1641	Toronto, river	April 17, 1901	28	78	c	2 earthy
1713	“ “	June 24, 1901	20	*d* 657	c	earthy
1781	“ “	July 18, 1901	29	58	s	2 earth.& veg
1838	“ “	Aug. 17, 1901	21	(*u*) slight	s	2 veg.
	AVERAGE	....	25	198	.....	......
1642	Toronto, hydrant	April 17, 1901	26	50	s	2 earthy
1714	“ “	June 24, 1901	22	96	dec	veg.
1782	“ “	July 18, 1901	25	(*u*) slight	t	2 earthy
1839	“ “	Aug. 17, 1901	22	(*u*)v'ry slight	v. s.	faint
	AVERAGE	....	24	37	......	....

OF PUBLIC WATER SUPPLIES FROM THE OHIO RIVER — Continued.

Million.)

UNTREATED SUPPLIES.

Oxygen Required.	Nitrogen as				Chlorine.	Alkalinity.	Incrusting Constituents.	Total Solids.	Loss on Ignition.	Suspended Solids.	Bacteria per c.c.	Colon Present.
	Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.								
8.90	.454	.022	.004	T	9.9	29	62	694	57	568	6000	—
28.03	1.570	.044	T	.20	3.1	26	......	4500	394	4406	26000	—
7.67	.350	.012	.003	.30	13.1	30	......	612	110	473	1900	—
6.14	.268	.006	.000	.08	7.3	35	......	407	30	322	7500	+
7.09	.282	.066	T	T	16.2	19	......	241	....	108	15000	+
11.57	.585	.030	.002	.12	9.9	28	......	1291	....	1175	11300	..

SUBSIDED SUPPLIES.

Oxygen Required.	Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.	Chlorine.	Alkalinity.	Incrusting Constituents.	Total Solids.	Loss on Ignition.	Suspended Solids.	Bacteria per c.c.	Colon Present.
3.37	.140	.025	.006	1.07	15.4	9	44	178	45	100	2300	+
4.97	.270	.050	.003	T	16.8	33	......	257	77	110	16300	+
4.05	.218	.142	.016	.17	23.4	33	......	244	77	57	5600	+
3.82	.162	.021	.012	T	30.7	35	......	241	83	10	1100	—
6.00	.226	.046	.003	.05	17.8	25	......	192	....	38	5100	—
5.72	.194	.052	.003	.08	16.3	34	......	168	....	u	20000	+
4.59	.224	.122	u	.10	22.7	40	......	218	....	u slight	12600	+
4.65	.205	.065	.007	.21	20.4	30	......	214	....	53	9000	..
1.71	.092	.024	.004	.11	7.8	8	23	112	31	54	1200	—
4.12	.204	.033	T	T	17.6	30	......	243	79	95	7200	+
3.91	.184	.032	.000	.08	24.0	30	......	218	120	35	2200	—
3.04	.086	.003	T	T	30.7	38	......	220	63	u t	300	—
6.96	.276	.024	.002	T	18.7	22	......	241	....	87	4200	—
5.49	.152	.007	.000	.00	17.0	29	......	143	....	u	2600	—
4.36	.166	.058	u	.12	21.2	39	......	195	....	u slight	1900	—
6:20	.302	.104	.002	.07	19.7	19	......	189	....	50	28900	+
4.47	.183	.036	.001	.05	19.6	27	......	195	....	46	6100	..
3.53	.136	.026	.006	.24	9.0	11	35	178	41	105	4000	+
7.76	.410	.074	.004	T	12.7	26	......	527	68	392	8400	+
3.15	.174	.023	.014	.42	24.4	30	......	224	68	38	1700	+
2.62	.152	.084	.015	.08	33.6	30	......	269	115	34	5100	—
4.51	.218	.052	.010	.19	19.9	24	......	299	73	142	4800	..
2.72	.120	.024	.005	.16	7.0	12	42	131	62	42	1700	—
2.61	.150	.020	.001	T	10.5	23	......	184	69	63	5200	—
2.19	.100	.002	.000	.30	18.1	28	......	187	54	18	375	—
2.94	.104	.003	T	T	29.3	33	......	228	86	16	800	—
2.61	.119	.012	.002	.12	16.2	24	......	182	68	35	2000	..

RECORD OF CHEMICAL AND BACTERIOLOGICAL EXAMINATIONS

SUBSIDED SUPPLIES.

(Parts per

Sample Number.	Locality of Sample.	Date Collected	Color.	Turbidity.	Sediment.	Odor.
1643	Steubenville, river	April 17, 1901	28	63	c	2 veg.
1731	" "	June 28, 1901	30	470	c	earthy
1777	" "	July 17, 1901	35	37	dec	2 veg.
1816	" "	Aug. 12, 1901	30	*u* very slight	v. s.	trace
1910	" "	Oct. 9, 1901	off, hi'h	136	c	5 foul
2011	" "	Dec. 11, 1901	38	158	c	veg. & earthy
	AVERAGE	....	32	144	......	....
1644	Steubenville, hydrant ..	April 17, 1901	27	37	s	2 earthy
1715	" " ..	June 24, 1901	20	68	s	veg.
1776	" " ..	July 17, 1901	30	very slight	t	none
1815	" " ..	Aug. 12, 1901	8	none	none	trace
1911	" " ..	Oct. 9, 1901	26	t	t	none
2012	" " ..	Dec. 11, 1901	30	very slight	v. s.	none
	AVERAGE	....	23	....	......	....
1672	Marietta, river	May 14, 1901	26	645	c	earthy
1729	" "	June 27, 1901	35	336	c	earthy
1794	" "	July 23, 1901	35	126	c	veg.
1848	" "	Aug. 19, 1901	25	83	s	veg.
1874	" "	Sept. 9, 1901	26	131	dec	faint
1898	" "	Sept. 28, 1901	45	42	s	2 veg.
1923	" "	Oct. 11, 1901	35	29	dec	veg.
2014	" "	Dec. 11, 1901	45	126	dec	veg.
	AVERAGE	....	34	190	.....	....
1671	Marietta, hydrant	May 14, 1901	24	429	c	earthy
1730	" "	June 27, 1901	35	316	c	earthy
1793	" "	July 23, 1901	32	92	s	veg. & earthy
1847	" "	Aug. 19, 1901	16	73	s	4 oily
1873	" "	Sept. 9, 1901	14	201	dec	strong
1897	" "	Sept. 28, 1901	30	46	dec	stale veg.
1924	" "	Oct. 11, 1901	15	46	dec	2putrefactive
2015	" "	Dec. 11, 1901	45	121	dec	veg.
	AVERAGE	....	26	166	......	....

OF PUBLIC WATER SUPPLIES FROM THE OHIO RIVER — Continued.

Million.) SUBSIDED SUPPLIES.

Oxygen Required.	Nitrogen as				Chlorine.	Alkalinity.	Incrusting Constituents.	Total Solids.	Loss on Ignition.	Suspended Solids.	Bacteria per c.c.	Colon Present.
	Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.								
3.31	.138	.042	.009	.06	9.7	14	34	181	45	91	2600	+
5.35	.264	.080	.006	T	9.7	20	......	382	74	239	4500	—
3.92	.220	.052	.008	.18	32.4	26	......	236	83	34	700	+
4.40	.192	.022	.004	T	31.4	u	......	u	u	(u) v slight	1250	+
288.97	.398	.140	.000	.00	interference	33	139	684	371	u	1031000	—
7.33	.348	.092	.002	.05	30.0	27	......	284	....	119	17000	+
52.21	.260	.071	.005	.05	22.6	24	......	353	....	97	176000	..
2.10	.094	.029	.005	.13	6.0	19	40	106	44	32	5200	—
2.21	.130	.008	T	T	9.6	21	......	167	61	43	30000	—
2.52	.100	.024	.000	.14	17.9	23	......	172	57	(u) t	550	—
2.28	.108	.024	.000	.03	39.4	40	......	193	59	......	800	—
3.40	.174	.016	.000	.10	19.5	32	33	137	....	(u) t	115	—
5.01	.168	.028	T	.07	6.2	u	......	u	....	(u) t	1200	—
2.92	.129	.021	.001	.08	16.4	27	......	155	....	......	6300	..
9.07	5.16	.062	.005	.00	10.5	14	25	820	125	691	6300	+
6.08	2.88	.042	.008	.28	15.7	29	......	357	77	238	2400	—
4.11	2.38	.012	.000	.18	18.0	12	......	276	78	95	5500	+
4.46	2.00	.012	T	.06	37.3	43	......	313	91	86	2700	—
5.02	1.48	.009	.000	T	14.4	25	......	178	....	34	2300	—
5.38	1.50	.020	.000	T	12.2	25	......	155	....	48	3900	+
3.69	1.83	.024	T	T	26.8	32	......	184	....	u	5200	+
7.26	2.94	.056	.000	T	27.8	19	......	281	....	138	12700	+
5.63	2.52	.030	.002	.07	20.3	25	......	320	....	190	5200	..
4.40	.229	.043	.004	T	12.3	22	55	342	62	200	3500	—
5.03	.272	.024	.000	.22	15.1	29	......	325	81	189	4200	—
2.79	.184	.011	.000	.06	21.7	21	......	206	76	u	2200	—
3.09	.202	.016	.000	.06	43.7	46	......	313	82	64	1800	—
4.77	.172	.007	.000	T	17.5	33	......	179	....	u	5100	—
5.17	.234	.016	.000	T	12.4	42	......	176	....	77	2200	—
3.73	.208	.018	.005	T	23.9	38	......	176	....	11	1100	+
7.12	.334	.062	.000	T	11.8	17	......	208	....	147	12000	+
4.51	.229	.025	.001	.04	19.8	31	......	241	....	114	4000	..

RECORD OF CHEMICAL AND BACTERIOLOGICAL EXAMINATIONS

SUBSIDED SUPPLIES.

(Parts per

Sample Number.	Locality of Sample.	Date Collected	Color.	Turbidity.	Sediment.	Odor.
1682	New Richmond, river..	May 18, 1901	30	316	c	earthy
1732	" " ..	June 29, 1901	26	*e* 3330	m	earthy
1789	" " ..	July 23, 1901	43	287	s	earthy
1850	" " ..	Aug. 19, 1901	29	316	dec	veg.
1905	" " ..	Oct. 8, 1901	20	trace	trace	trace
2016	" " ..	Dec. 11, 1901	50	141	dec	earthy
	AVERAGE	....	33	732	......	....
1683	New Richmond, hydrant	May 18, 1901	25	58	s	none
1733	" "	June 29, 1901	23	*f* 1896	c	earthy
1790	" "	July 23, 1901	40	slight	T	faint
1851	" "	Aug. 19, 1901	24	slight	v. s.	2 veg.
1906	" "	Oct. 8, 1901	26	trace	t	trace
2017	" "	Dec. 11, 1901	18	slight	v. s.	none
	AVERAGE	....	26	326	..	....

FILTERED SUPPLIES.

Sample Number.	Locality of Sample.	Date Collected	Color.	Turbidity.	Sediment.	Odor.
1650	Mingo Junction, river..	April 17, 1901	30	63	c	2 veg.
1724	" " ..	June 25, 1901	35	207	c	earthy
1774	" " ..	July 17, 1901	40	63	c	2 musty
1834	" " ..	Aug. 13, 1901	27	(*u*) slight	s	oily
1957	" ..	Oct. 31, 1901	60	88	s	5 bad
	AVERAGE	....	38	84	.. ...	. ...
1651	Mingo Junct'n, hydrant	April 17, 1901	28	t	t	trace
1725	" "	June 25, 1901	24	t	v. s.	none
1775	" "	July 17, 1901	8	t	t	none
1835	" "	Aug. 13, 1901	5	0	0	raw oysters
1958	" "	Oct. 31, 1901	0	0	0	none
	AVERAGE	....	13	. .. .	......	... .
1673	Pomeroy, river	May 15, 1901	22	515	c	earthy
1727	" "	June 27, 1901	40	*l* 4668	m	earthy
1786	" "	July 23, 1901	45	666	c	earthy
1846	" "	Aug. 19, 1901	19	slight	v. s.	oily
1892	" "	Sept. 24, 1901	50	249	dec	earthy
2040	" "	Dec. 23, 1901	55	189	dec	earthy
	AVERAGE	....	39	1048	......	....

OF PUBLIC WATER SUPPLIES FROM THE OHIO RIVER — Continued.

Million.)

SUBSIDED SUPPLIES.

Oxygen Required.	Nitrogen as				Chlorine.	Alkalinity.	Incrusting Constituents.	Total Solids.	Loss on Ignition.	Suspended Solids.	Bacteria per c.c.	Colon Present.
	Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.								
5.99	.216	.007	.001	T	8.6	35	71	495	72	377	3300	—
10.72	.486	.042	.001	T	4.5	36	......	827	109	712	5800	—
2.54	.158	.004	.002	.06	9.9	46	......	182	52	54	800	—
3.72	.202	.018	T	T	5.3	35	......	273	50	195	6000	—
3.31	.140	.020	.000	.10	10.5	43	......	128	....	trace	750	+
6.29	.244	.048	T	.04	15.1	24	......	220	....	101	5700	—
5.43	.241	.023	.001	.03	9.0	37	......	354	....	240	3700	..
2.06	.106	.007	T	T	7.4	42	34	169	39	50	1250	—
5.38	.256	.052	T	T	3.0	38	......	329	68	236	3200	—
1.98	.120	.016	.001	.13	8.0	56	......	129	60	trace	1400	—
2.19	.142	.280	.026	T	10.3	59	......	181	64	31	160	—
3.77	.138	.020	.000	.12	10.4	44	......	132	....	trace	475	—
2.01	.114	.018	.000	.06	19.9	49	......	172	....	trace	375	—
2.90	.146	.065	.005	.05	9.8	48	......	185	....	51	1100	..

FILTERED SUPPLIES.

3.86	.128	.007	.004	T	7.8	13	14	181	73	78	13000	—
6.49	.266	.100	.005	T	16.9	25	41	343	85	174	6100	+
7.54	.248	.452	.012	.31	27.0	32	49	251	81	52	16800	+
6.60	.234	.220	.010	.15	36.9	44	51	289	117	32	14000	+
9.04	.246	.478	.012	.00	39.2	56	49	302	....	42	81000	+
6.71	.224	.251	.009	.09	25.6	34	41	269	....	76	26200	..
.80	.056	005	.004	2.67	19.8	47	45	215	69	19	475	—
.94	.072	.010	T	3.20	21.9	55	74	265	77	34	13800	—
1.28	.054	.011	T	4.35	22.6	60	92	279	71	trace	220	—
1.14	.048	.004	.006	4.82	32.8	74	109	347	103	......	4700	—
.58	.099	.037	T	2.80	30.5	76	96	327	....	......	75	—
.95	.066	.013	.002	3.57	25.5	62	83	287	....	11	3900	..
9.73	.460	.056	.004	.00	11.7	28	32	1005	100	866	8400	+
14.90	1.024	.041	T	.20	8.7	40	24	1926	187	1794	15000	+
3.99	.234	.036	T	.05	24.8	33	35	342	117	139	1650	+
2.82	.200	.042	.000	.05	37.0	64	65	284	90	22	4600	—
6.40	.206	.018	.000	T	12.8	21	9	234	....	116	11500	—
7.98	.296	.040	.002	.12	7.2	14	13	257	....	149	7000	+
7.64	.403	.039	.001	.07	17.0	34	30	675	....	514	8000	..

RECORD OF CHEMICAL AND BACTERIOLOGICAL EXAMINATIONS

FILTERED SUPPLIES. (Parts per

Sample Number.	Locality of Sample.	Date Collected.	Color.	Turbidity.	Sediment.	Odor.
1674	Pomeroy, hydrant	May 15, 1901	10	t	T	none
1728	" "	June 27, 1901	20	s	s	faint
1787	" "	July 23, 1901	10	s	v. s.	trace
1845	" "	Aug. 19, 1901	18	t	t	none
1893	" "	Sept. 24, 1901	5	0	0	none
2041	" "	Dec. 23, 1901	0	0	0	none
	AVERAGE	....	10	....	.....	....
1675	Gallipolis, river	May 16, 1901	24	429	c	earthy
1734	" "	July 1, 1901	26	*e* 2350	c	earthy
1784	" "	July 23, 1901	35	*d* 1716	m	earthy
1841	" "	Aug. 19, 1901	25	281	c	earthy
1890	" "	Sept. 21, 1901	35	*c* 906	c	earthy
1908	" "	Oct 9, 1901	28	(*u*) slight	s	veg.
2026	" "	Dec. 14, 1901	35	302	c	veg. & earthy
	AVERAGE	....	30	826	......	... .
1676	Gallipolis, hydrant	May 16, 1901	8	0	0	none
1735	" "	July 1, 1901	20	t	v. s.	none
1785	" "	July 23, 1901	10	t	v. s.	none
1840	" "	Aug. 19, 1901	13	t	v. s.	2 veg.
1891	" "	Sept. 21, 1901	10	0	0	none
1909	" "	Oct. 9, 1901	T	0	0	none
2027	" "	Dec. 14, 1901	10	0	0	none
	AVERAGE	....	10	....	.....	....
1680	Ripley, river	May 17, 1901	30	237	c	earthy
1798	" "	Aug. 5, 1901	25	42	v. s.	2 veg.
1887	" "	Sept. 17, 1901	32	92	dec	veg.
	AVERAGE	....	29	124	... ..	....
1681	*Ripley, hydrant	May 17, 1901	T	0	0	0
1799	....	Aug. 5, 1901	12	0	0	0
1888	....	Sept. 17, 1901	10	0	0	0
	AVERAGE	....	7	0	0	0

* Ground not river water.

OF PUBLIC WATER SUPPLIES FROM THE OHIO RIVER — Concluded.

Million.) FILTERED SUPPLIES.

Oxygen Required.	Nitrogen as				Chlorine.	Alkalinity.	Incrusting Constituents.	Total Solids.	Loss on Ignition.	Suspended Solids.	Bacteria per c.c.	Colon Present.
	Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.								
1.77	.080	.029	.002	.00	13.4	38	39	197	90	32	275	—
1.50	.074	.024	.003	T	9.7	......	57	189	55	37	130	—
1.44	.127	.000	.010	.06	25.8	—26	141	306	123	12	21	—
2.88	.162	.005	.000	.05	36.8	61	77	266	86	t	65	—
1.27	.063	.011	T	T	14.4	4	63	161	....	......	4	—
1.97	.104	.002	.002	.11	7.1	—28	61	156	....	......	95	—
1.80	.101	.012	.003	.04	17.9	8	73	212	....	14	100	..
7.30	.319	.058	.004	T	10.9	24	44	420	52	282	7500	—
9.77	.414	.034	.002	T	11.0	39	......	717	117	575	3400	—
5.67	.286	.028	.002	T	34.6	36	57	478	121	271	1600	—
4.18	.174	.011	T	.18	28.0	52	......	295	78	110	1300	+
7.24	.318	.014	.000	.08	24.8	36	......	542	....	393	1500	—
3.65	.150	.024	.000	.10	24.5	45	......	203	....	u slight	375	—
10.31	.398	.096	.004	.24	21.7	27	......	530	....	385	41000	+
6.87	.294	.038	.002	.09	22.2	37	......	455	....	288	8100	..
.52	.035	.003	.001	T	11.4	35	21	154	43	......	23	—
.47	.036	.008	.001	T	10.1	38	......	149	70	t	55	—
.50	.029	.000	T	.19	17.5	43	46	173	71	12	325	—
.55	.008	.002	T	.09	19.3	52	......	171	55	t	85	—
.24	.020	.003	T	T	20.2	43	......	150	....	......	475	—
.80	.087	.013	.002	.10	20.0	46	......	158	....	......	80	—
1.04	.024	.016	.000	.30	20.0	45	......	160	....	......	700	—
.59	.034	.006	.001	.10	16.9	46	......	159	....	......	250	..
4.89	.230	.024	.005	T	9.5	37	34	526	174	398	4400	—
2.32	.170	.046	T	T	15.5	49	52	178	....	u	1200	+
3.23	.126	.005	.000	.00	12.3	41	32	165	....	u	3300	+
3.48	.175	.025	.002	......	12.4	42	40	290	....	......	3000	..
.80	.024	.005	.000	.00	48.0	135	25	263	87	......	600	—
.68	.070	.006	.003	3.47	40.0	179	23	330	32	......	200	—
.96	.028	.003	.002	4.34	31.9	142	24	301	....	......	125	—
.81	.041	.005	.002	2.60	40.0	152	24	298	....	......	308	..

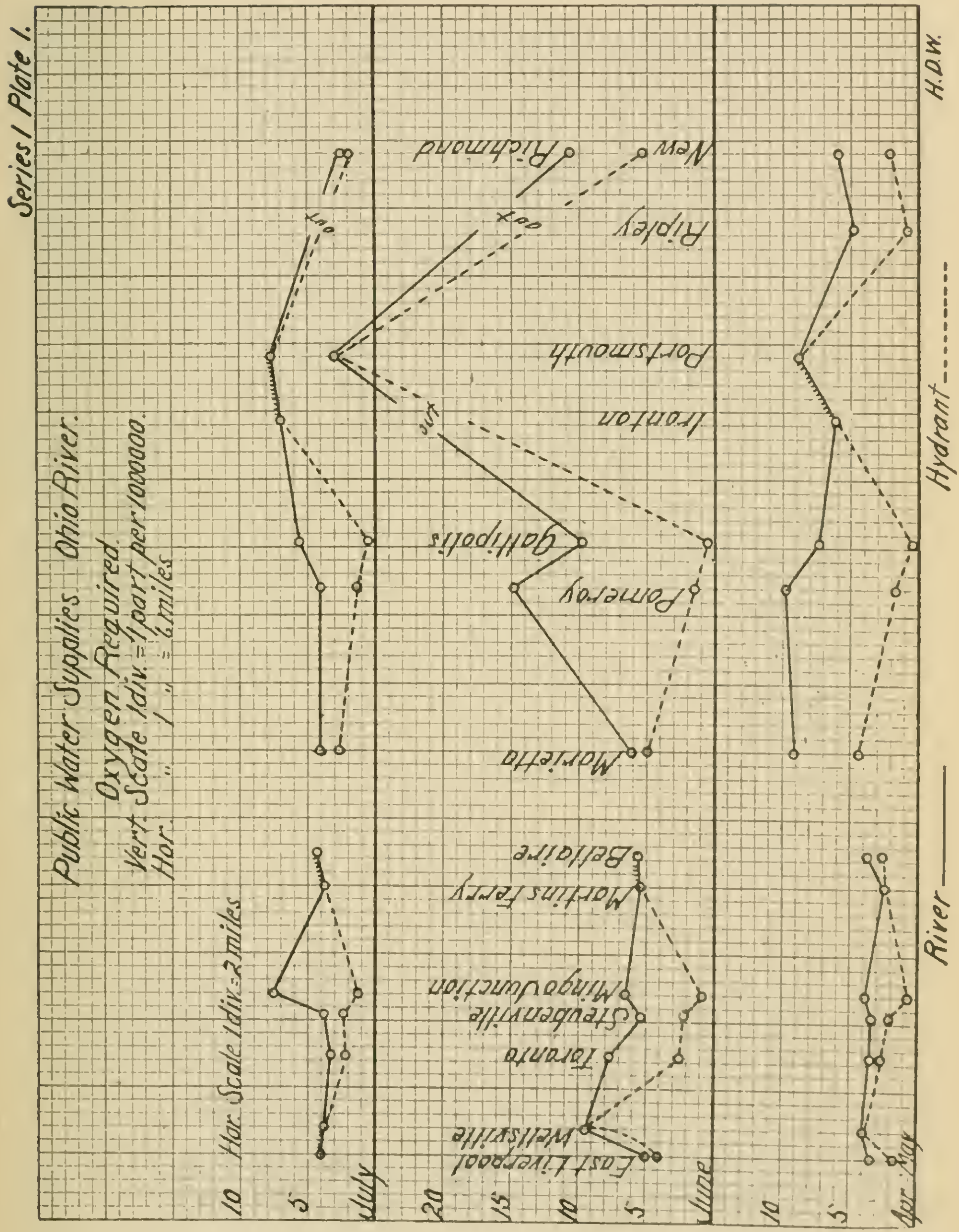
LIST OF PLATES.

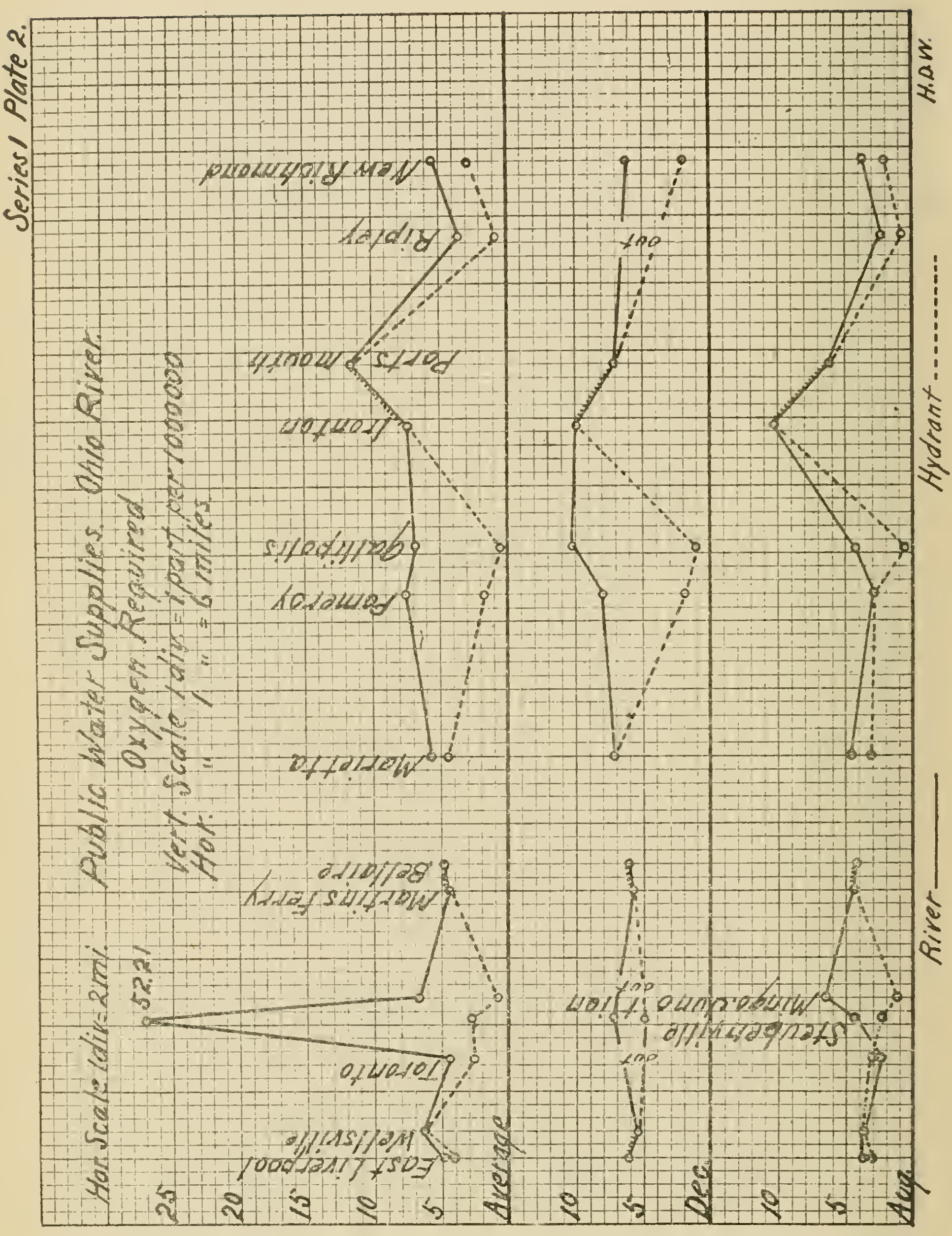
SERIES I. — OHIO RIVER.

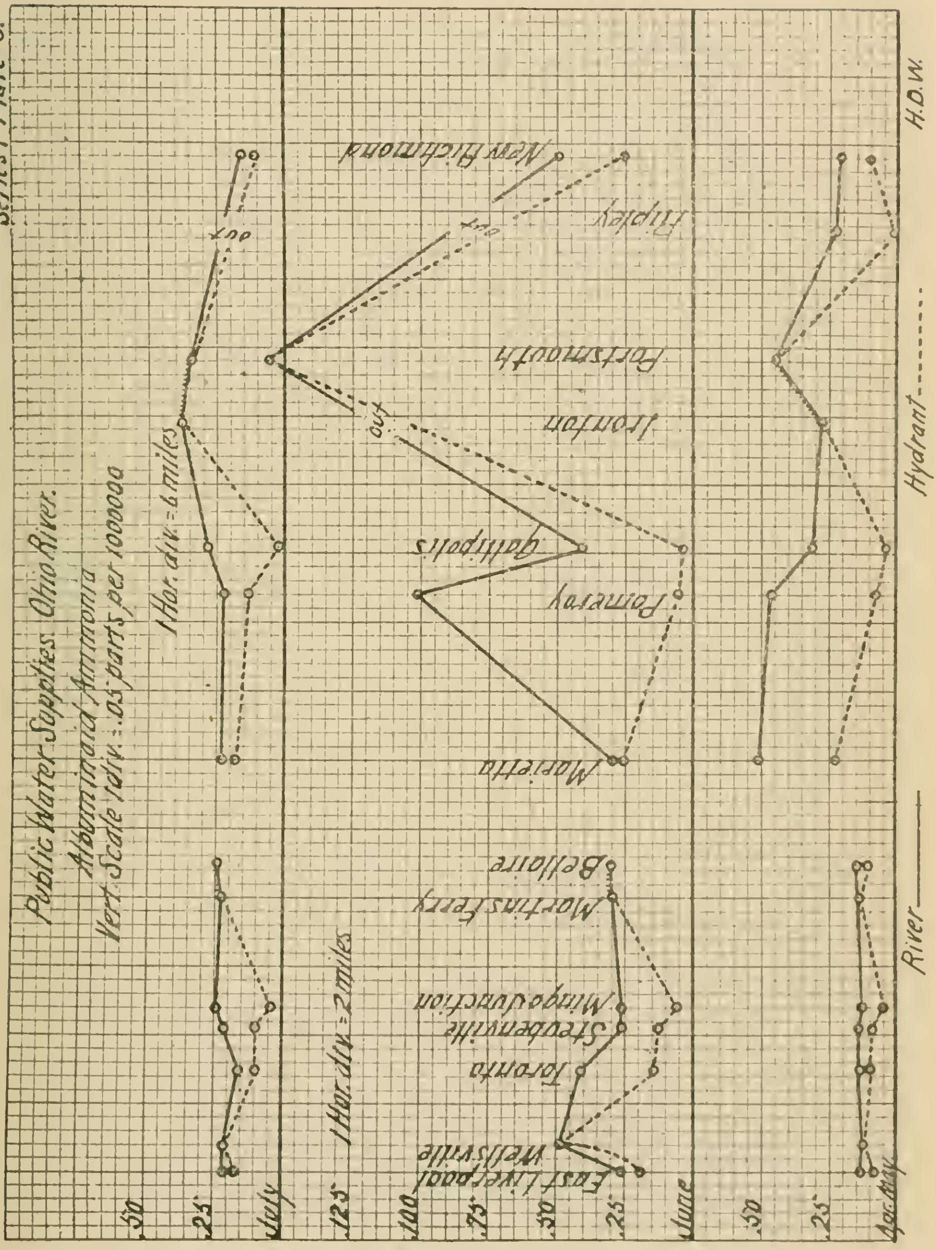
1 and 2. Oxygen Required.
3 and 4. N. as Albuminoid Ammonia.
5 and 6. N. as Free Ammonia.
7 and 8. Total Solids.
9 and 10. Suspended Solids.
11 and 12. Bacteria.

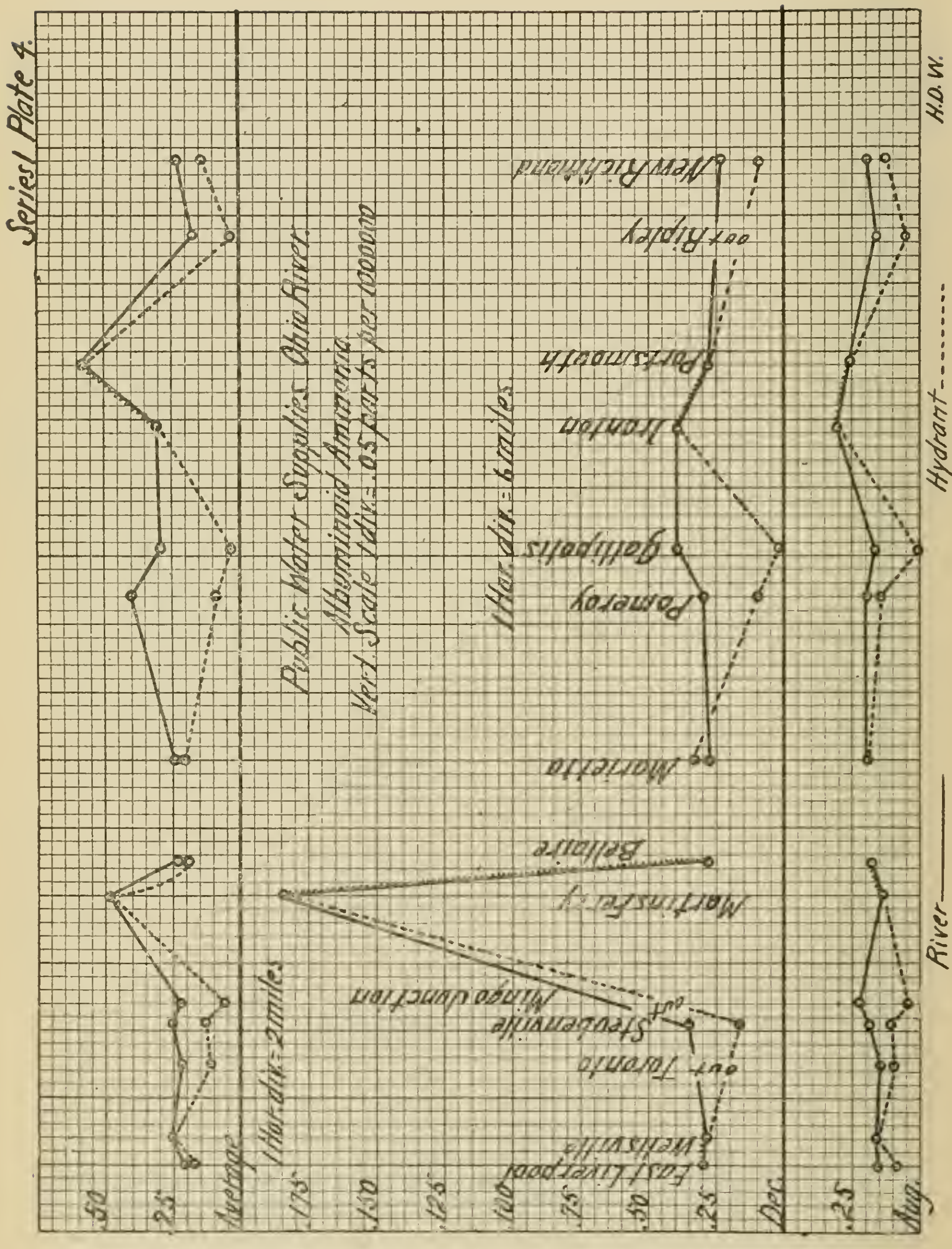
SERIES II. — CITIES.

13. Wellsville.
14. Martins Ferry.
15. Bellaire.
16. Ironton.
17. Portsmouth.
18. East Liverpool.
19. Toronto.
20. Steubenville.
21. Marietta.
22. New Richmond.
23. Mingo Junction.
24. Pomeroy.
25. Gallipolis.
26. Ripley.

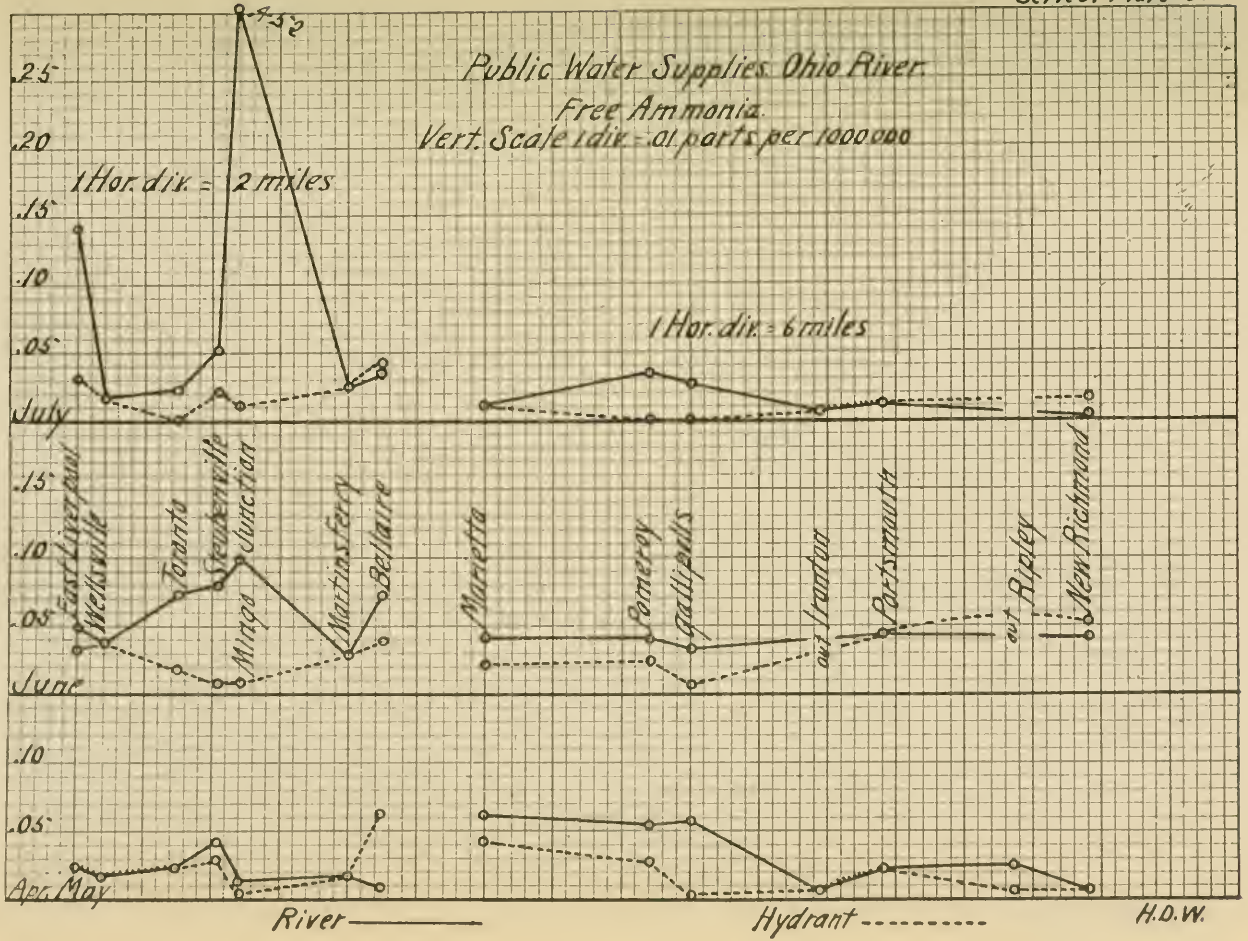

Series 1 Plate 1.
Public Water Supplies. Ohio River.
Oxygen Required.
Vert. Scale 1 div. = 1 part per 1000000.
Hor. " 1 " = 6 miles.
Hor. Scale 1 div. = 2 miles.
10
5
July
20
15
10
5
June
10
5
Apr. May
East Liverpool
Wellsville
Toronto
Steubenville
Mingo Junction
Martins Ferry
Bellaire
Marietta
Pomeroy
Gallipolis
Ironton
Portsmouth
Ripley
New Richmond
Oct
Oct
Oct
River ——
Hydrant ------
H.D.W.

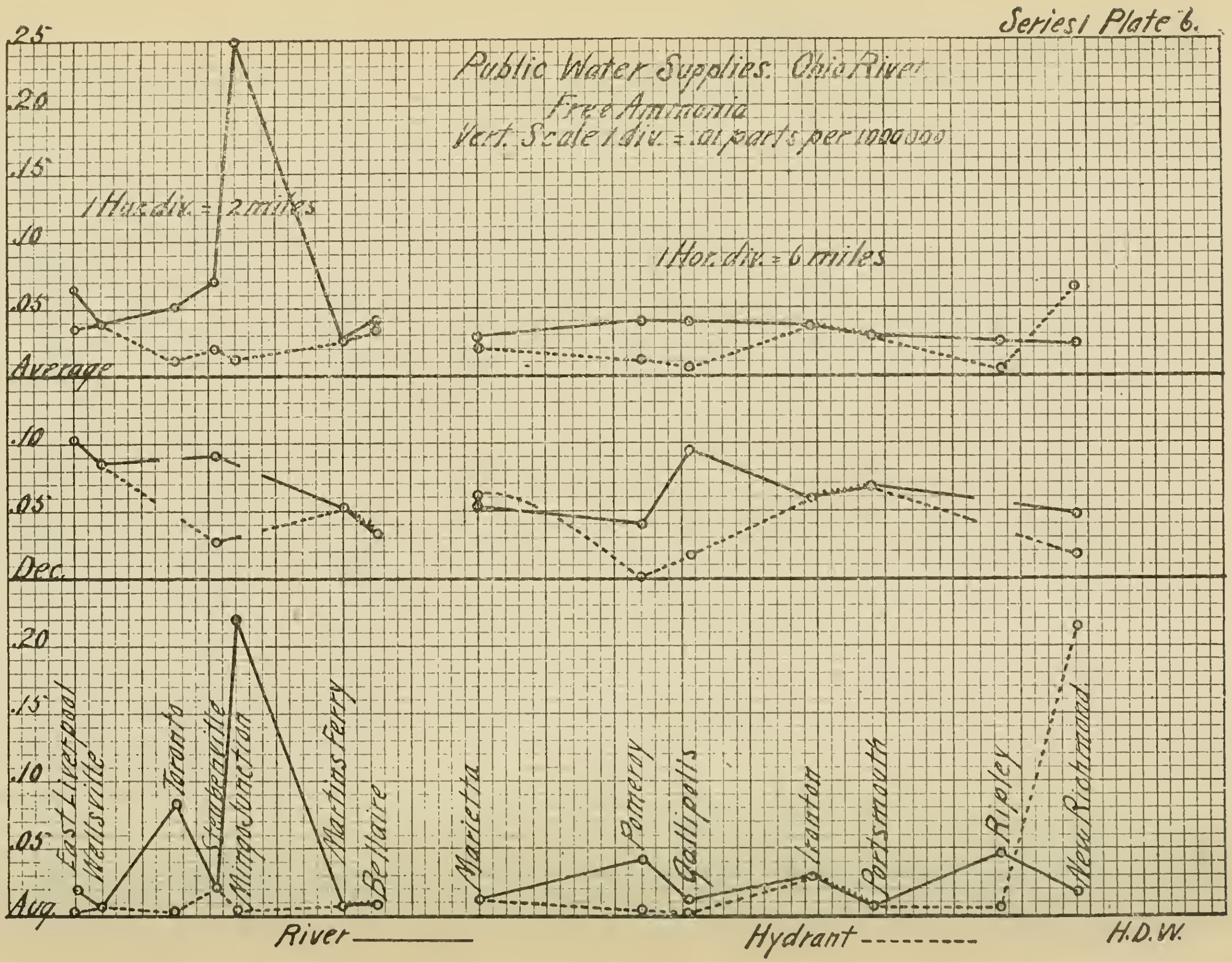

Series 1 Plate 2.
Public Water Supplies. Ohio River.
Oxygen Required
Vert. Scale 1 div. = 1 part per 1000000
Hor. " 1" = 6 miles
Hor. Scale 1 div. = 2 mi.
52.21
25
20
15
10
5
Average
10
5
Dec.
10
5
Aug.
East Liverpool
Wellsville
Toronto
Steubenville
Mingo Junction
Martins Ferry
Bellaire
Marietta
Pomeroy
Gallipolis
Ironton
Portsmouth
Ripley
New Richmond
out
out
out
River ——
Hydrant ----------
H.D.W.

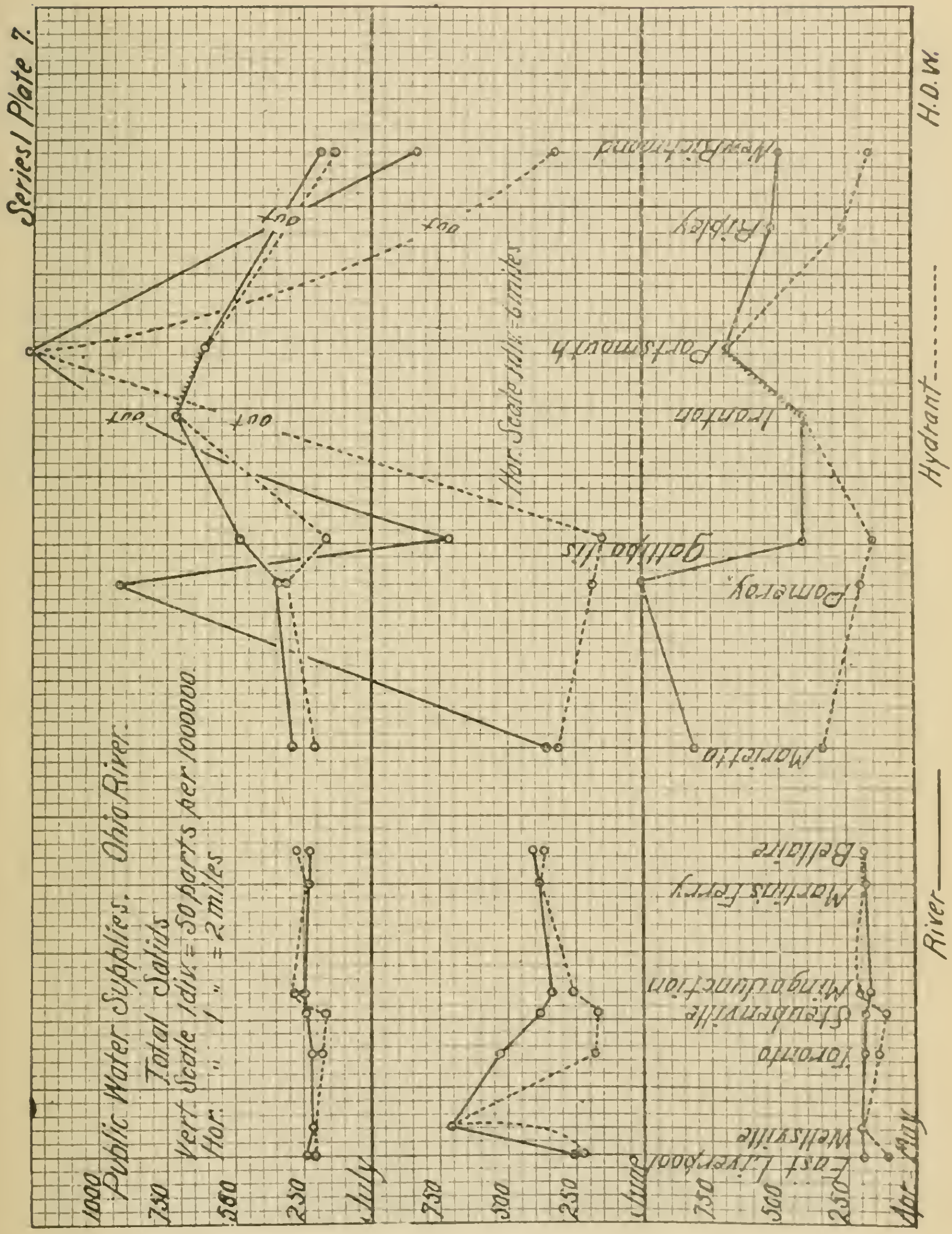

Series 1 Plate 3.
Public Water Supplies. Ohio River.
Albuminoid Ammonia
Vert. Scale 1 div. = .05 parts per 1000000
1 Hor. div. = 6 miles
1 Hor. div. = 2 miles
July
June
Apr. May
.50
.25
1.25
1.00
.75
New Richmond
Ripley
Portsmouth
Ironton
Gallipolis
Pomeroy
Marietta
Bellaire
Martins Ferry
Mingo Junction
Steubenville
Toronto
Wellsville
East Liverpool
out
River ———
Hydrant - - - - - - -
H.D.W.


Series I Plate 4.
Public Water Supplies Ohio River.
Albuminoid Ammonia
Vert. Scale 1 div. = .05 parts per 1000000
1 Hor. div. = 2 miles.
1 Hor. div. = 6 miles.
Average
.50
.25
1.75
1.50
1.25
1.00
.75
.50
.25
Dec.
.25
Aug.
East Liverpool
Wellsville
out Toronto
out Steubenville
Mingo Junction
Martinsferry
Bellaire
Marietta
Pomeroy
Gallipolis
Ironton
Portsmouth
out Ripley
New Richmond
River ——
Hydrant - - - - - -
H.D.W.

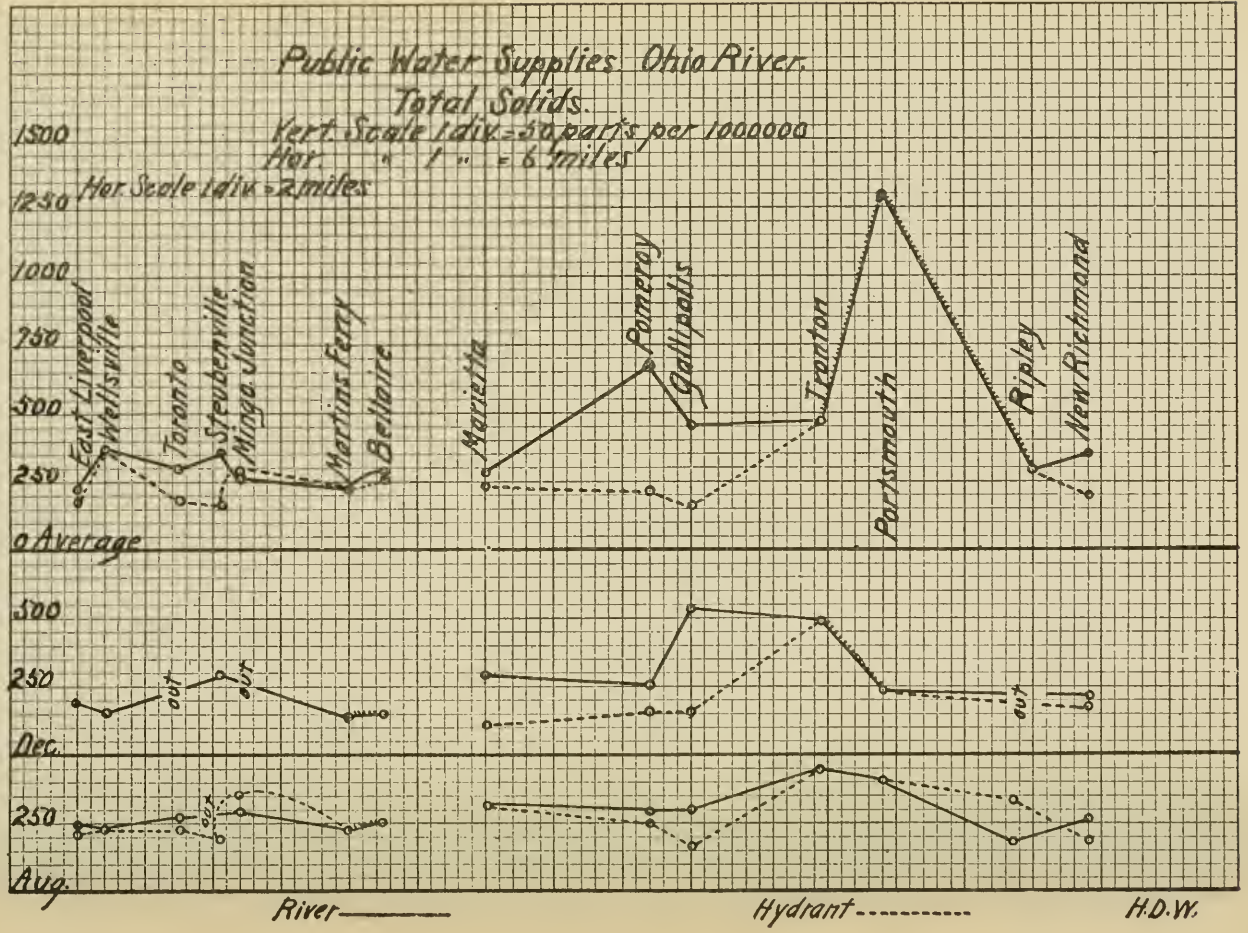
Series 1 Plate 5.

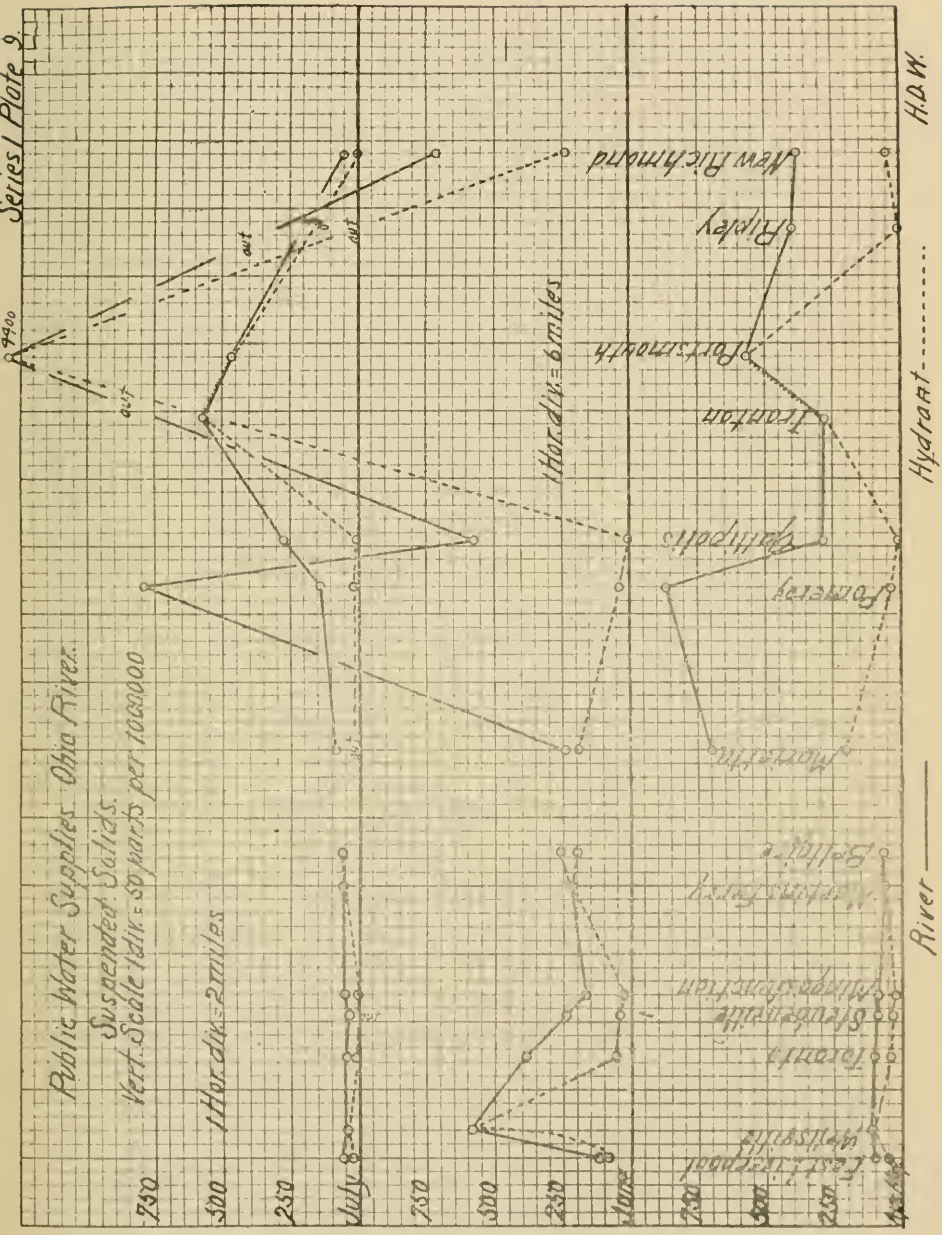


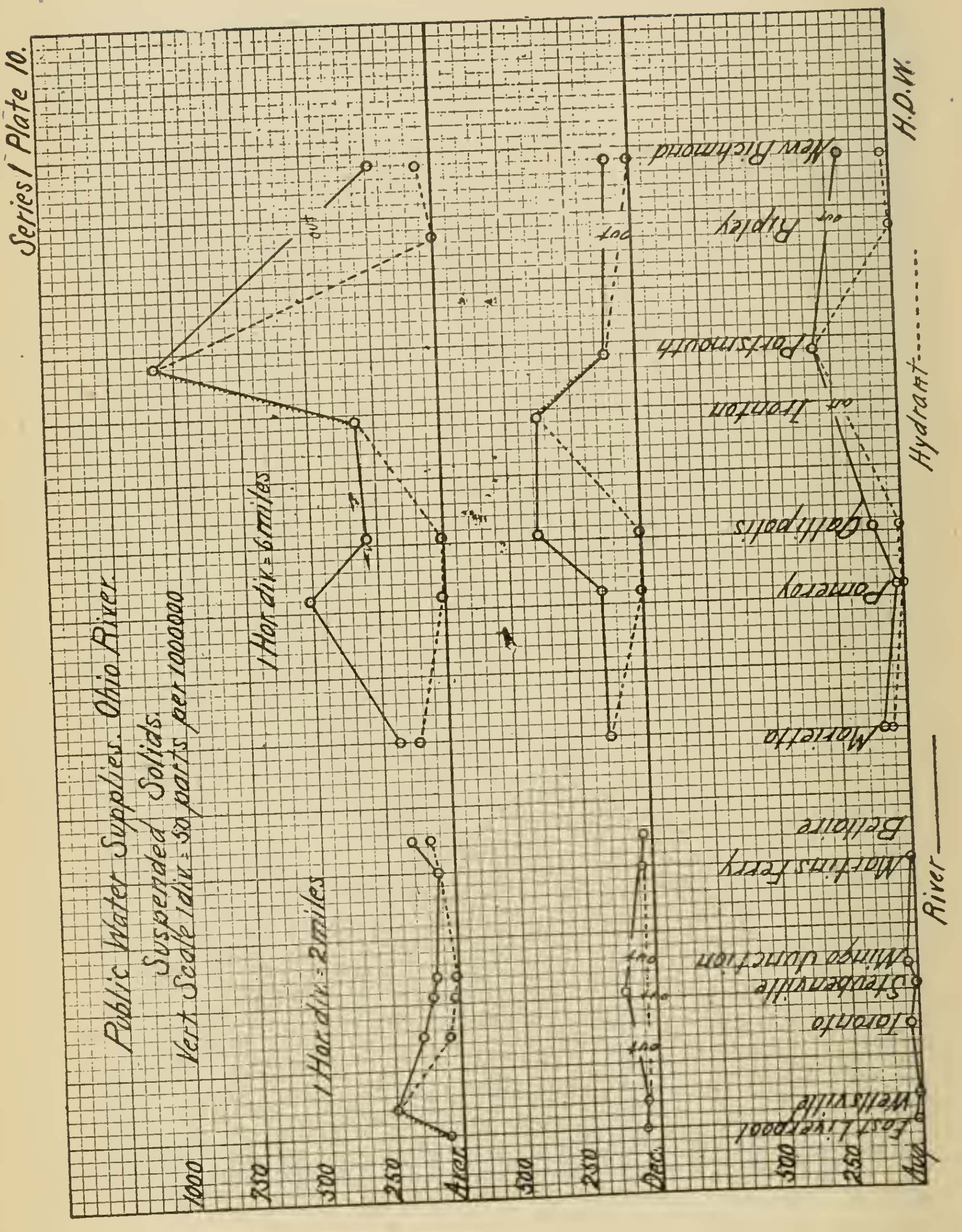

Series1 Plate 6.
Public Water Supplies: Ohio River
Free Ammonia
Vert. Scale 1 div. = .01 parts per 1000000
1 Hor. div. = 2 miles
1 Hor. div. = 6 miles
.25
.20
.15
.10
.05
Average
.10
.05
Dec.
.20
.15
.10
.05
Aug.
East Liverpool
Wellsville
Toronto
Steubenville
Mingo Junction
Martins Ferry
Bellaire
Marietta
Pomeroy
Gallipolis
Ironton
Portsmouth
Ripley
New Richmond
River ————
Hydrant ---------
H.D.W.

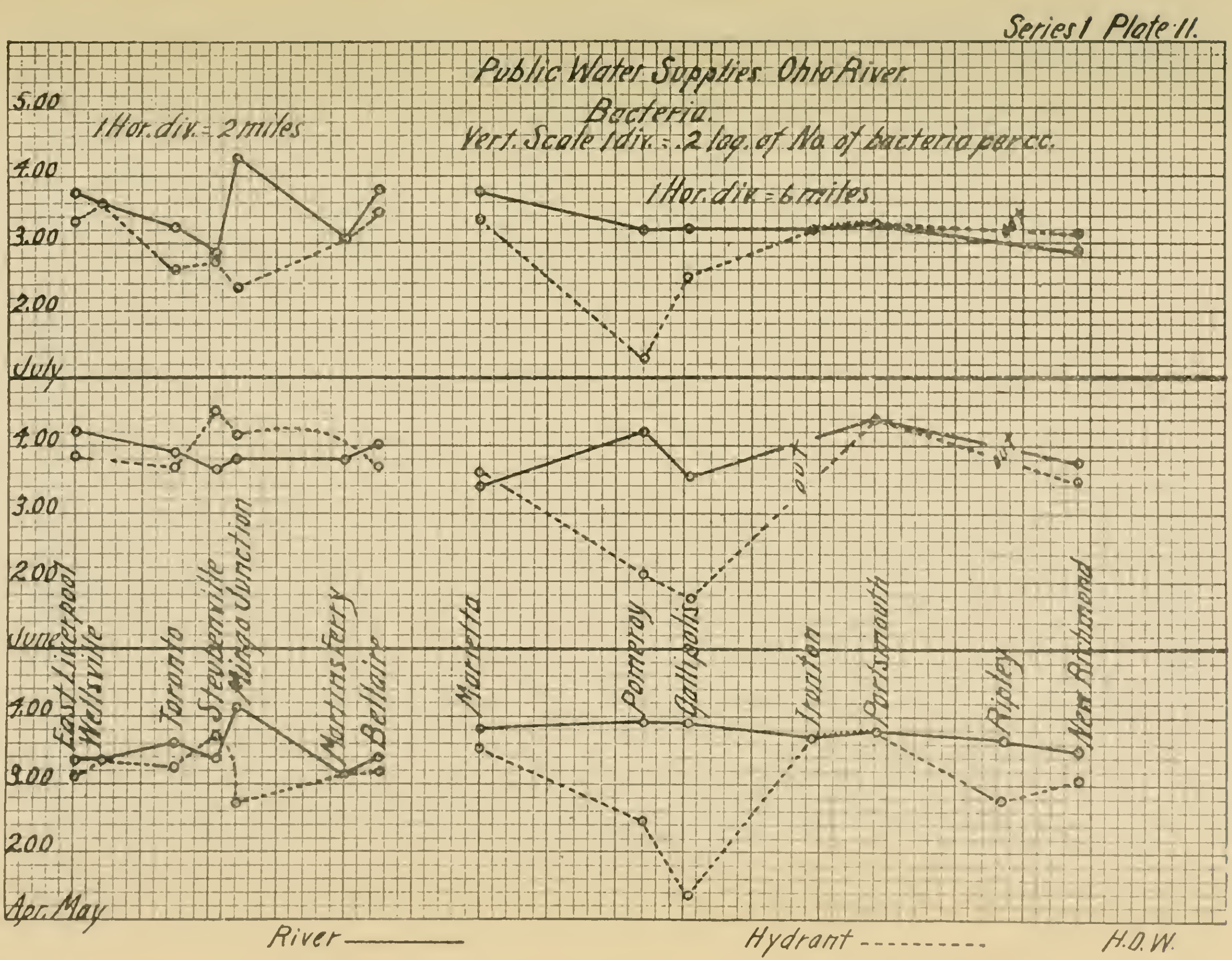

Series 1 Plate 7.
Public Water Supplies. Ohio River.
Total Solids
Vert. Scale 1 div. = 50 parts per 1000000
Hor. " 1 " = 2 miles
Hor. Scale 1 div. = 6 miles
1000
750
500
250
July
June
Apr. Aug.
East Liverpool
Wellsville
Toronto
Steubenville
Mingo Junction
Martins Ferry
Bellaire
Marietta
Pomeroy
Gallipolis
Ironton
Portsmouth
Ripley
New Richmond
out
River ——
Hydrant ------
H.D.W.

Series I Plate 8.

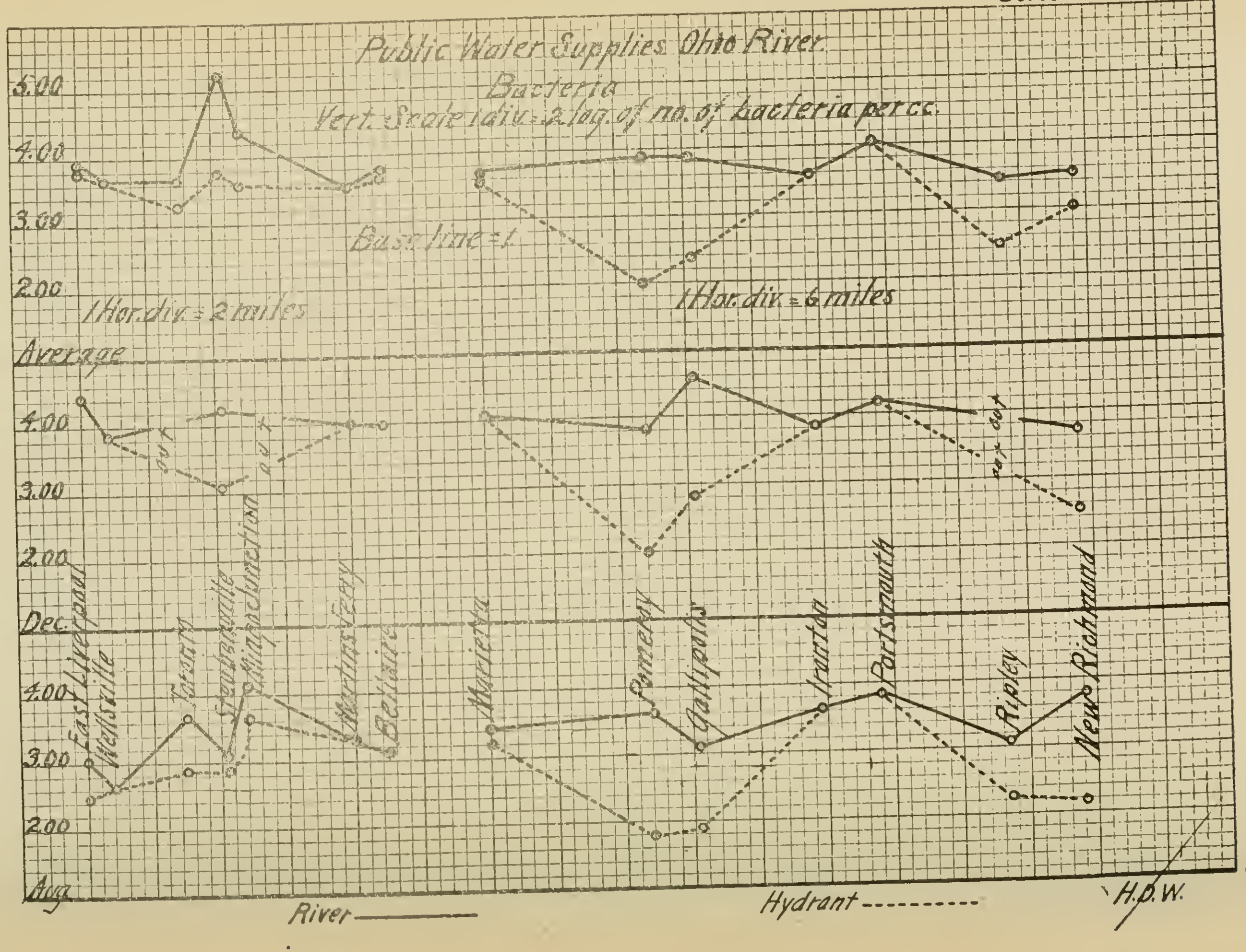


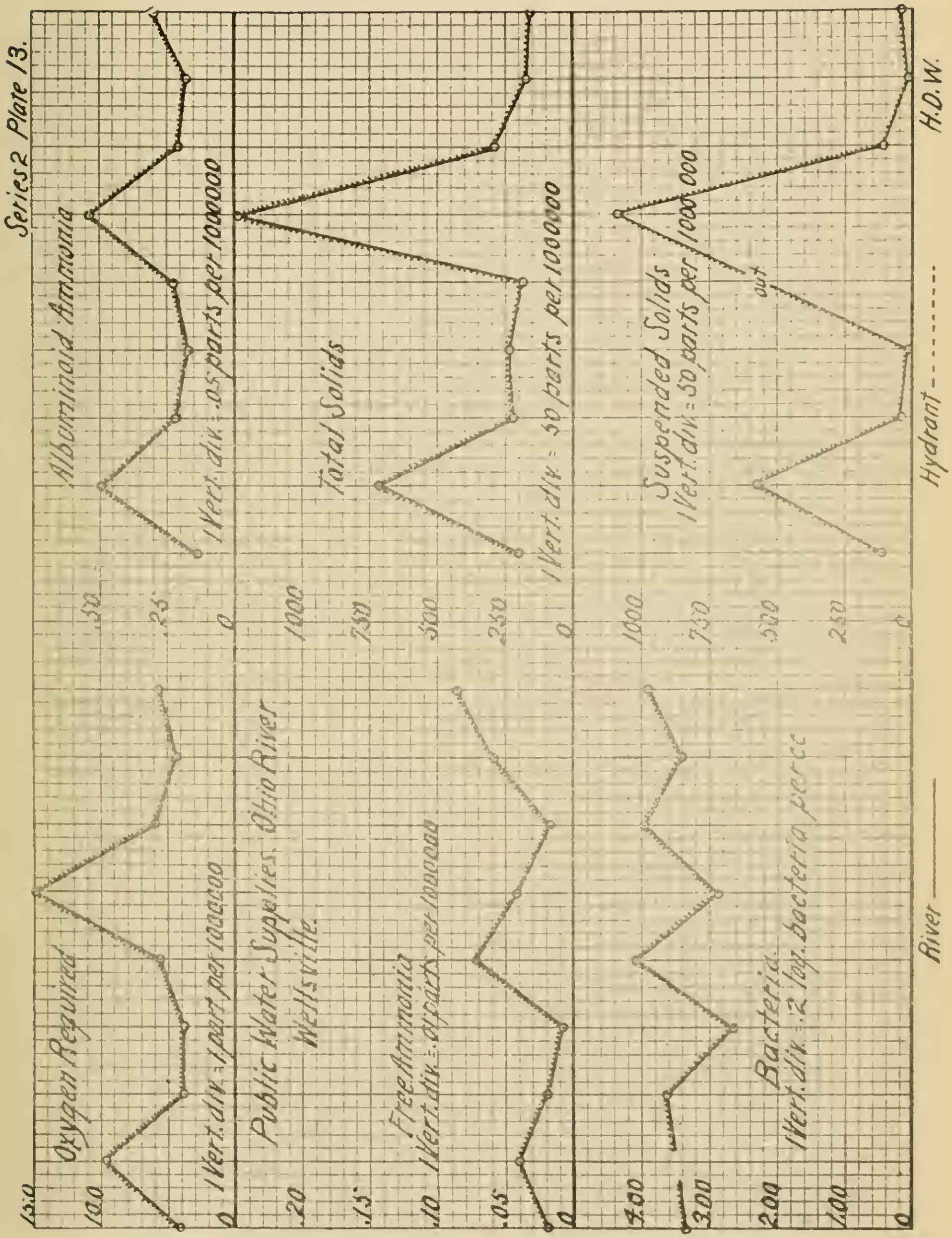

Series I Plate 9.
Public Water Supplies. Ohio River.
Suspended Solids.
Vert. Scale 1 div. = 50 parts per 1000000
1 Hor. div. = 2 miles
1 Hor. div. = 6 miles
H.D.W.
Hydrant ----------
River ——
7400
out
out
out
out
750
500
250
July 8
750
500
250
June
750
500
250
New Richmond
Ripley
Portsmouth
Ironton
Gallipolis
Pomeroy
Marietta
Bellaire
Martins Ferry
Mingo Junction
Steubenville
Toronto
Wellsville
East Liverpool

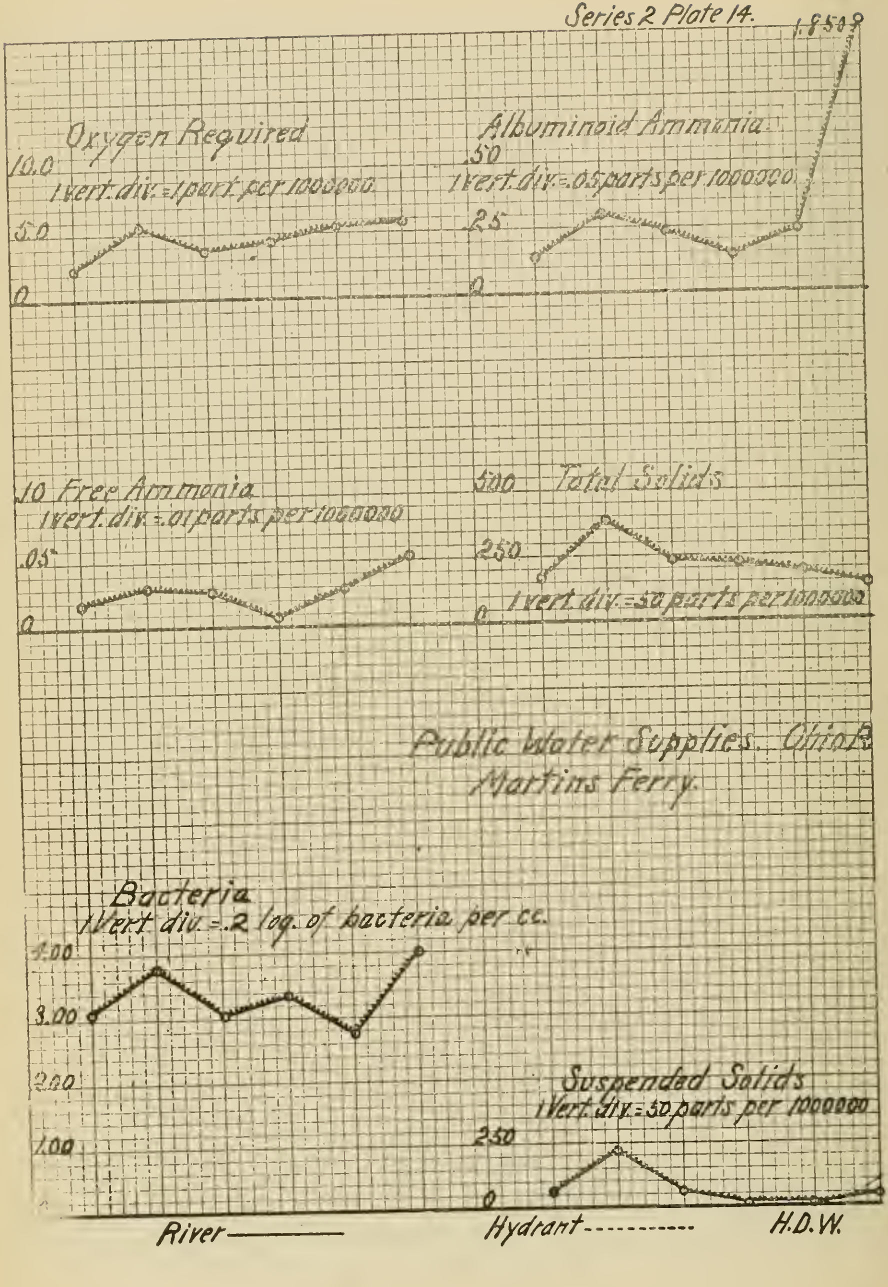

Series 1 Plate 10.
Public Water Supplies. Ohio River.
Suspended Solids.
Vert. Scale 1 div. = 50 parts per 1000000
1 Hor. div. = 2 miles
1 Hor. div. = 6 miles
1000
750
500
250
Aver.
500
250
Dec.
500
250
Aug.
out
East Liverpool
Wellsville
Toronto
Steubenville
Mingo Junction
Martins Ferry
Bellaire
Marietta
Pomeroy
Gallipolis
Ironton
Portsmouth
Ripley
New Richmond
River
Hydrant
H.D.W.

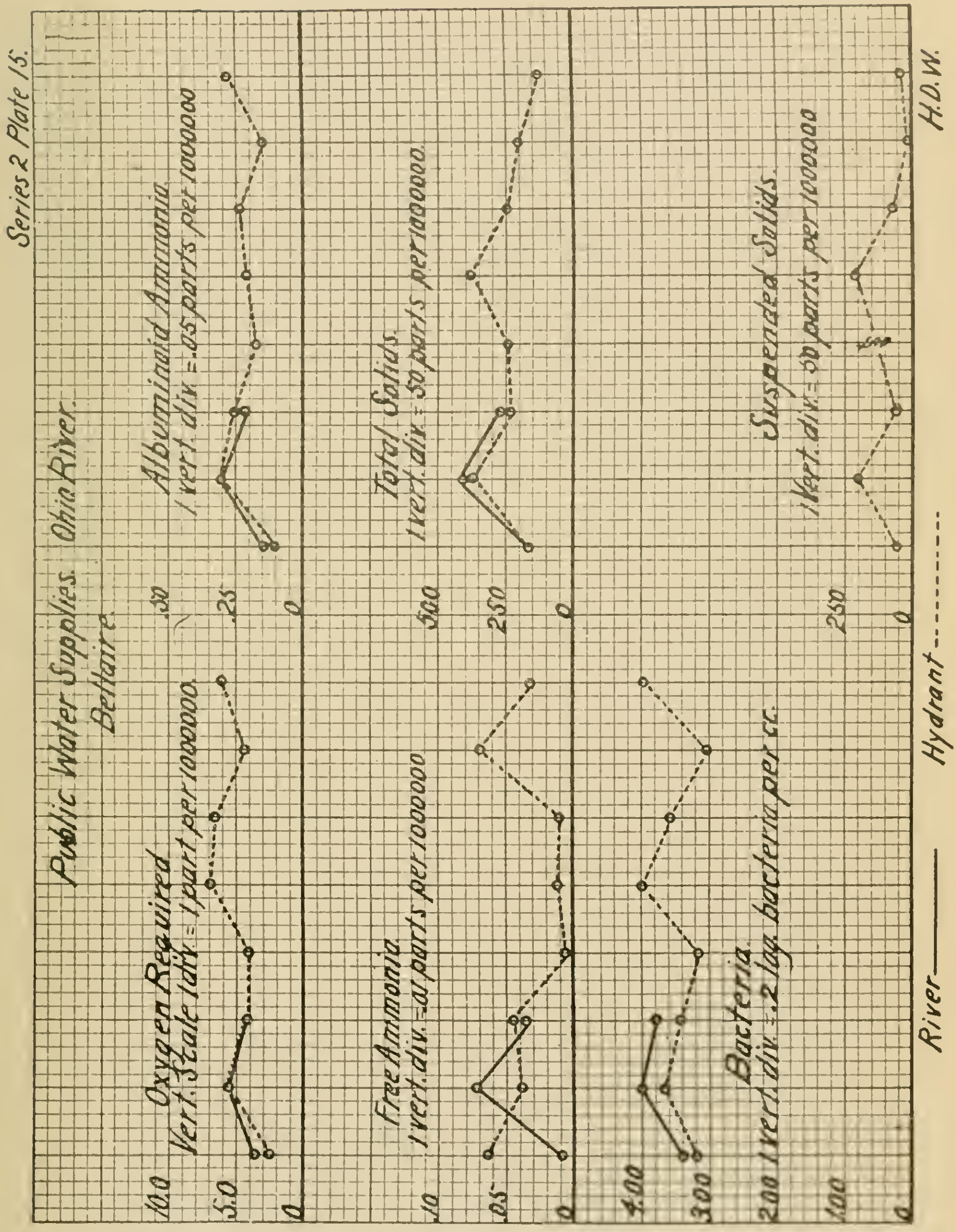

Series 1 Plate 11.
Public Water Supplies. Ohio River.
Bacteria.
Vert. Scale 1 div. = .2 log. of No. of bacteria per cc.
1 Hor. div. = 2 miles
1 Hor. div. = 6 miles.
5.00
4.00
3.00
2.00
July
4.00
3.00
2.00
June
4.00
3.00
2.00
Apr. May
East Liverpool
Wellsville
Toronto
Steubenville
Mingo Junction
Martins Ferry
Bellaire
Marietta
Pomeroy
Gallipolis
Ironton
Portsmouth
Ripley
New Richmond
100
River
Hydrant
H.O.W.

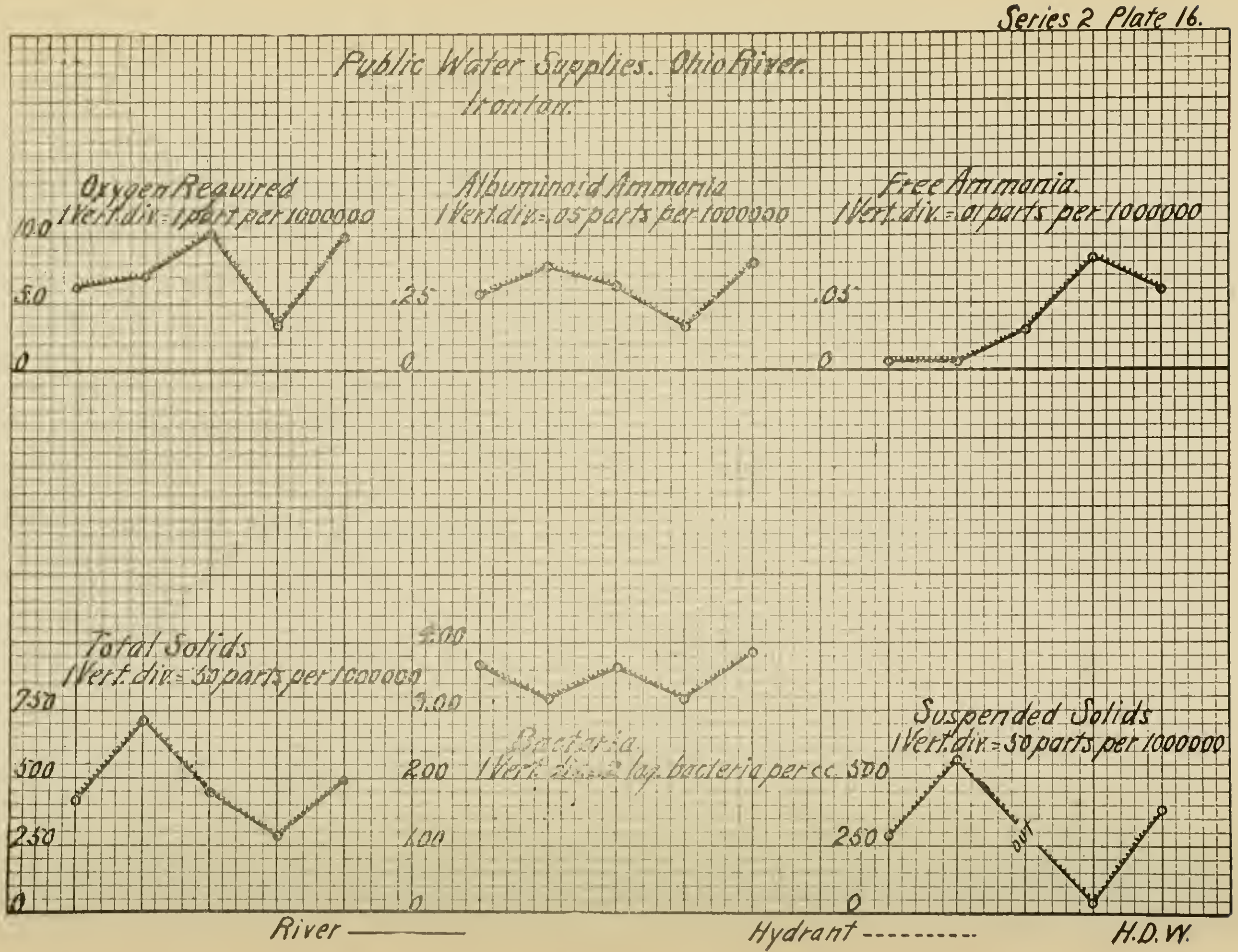
Series 1 Plate 12.

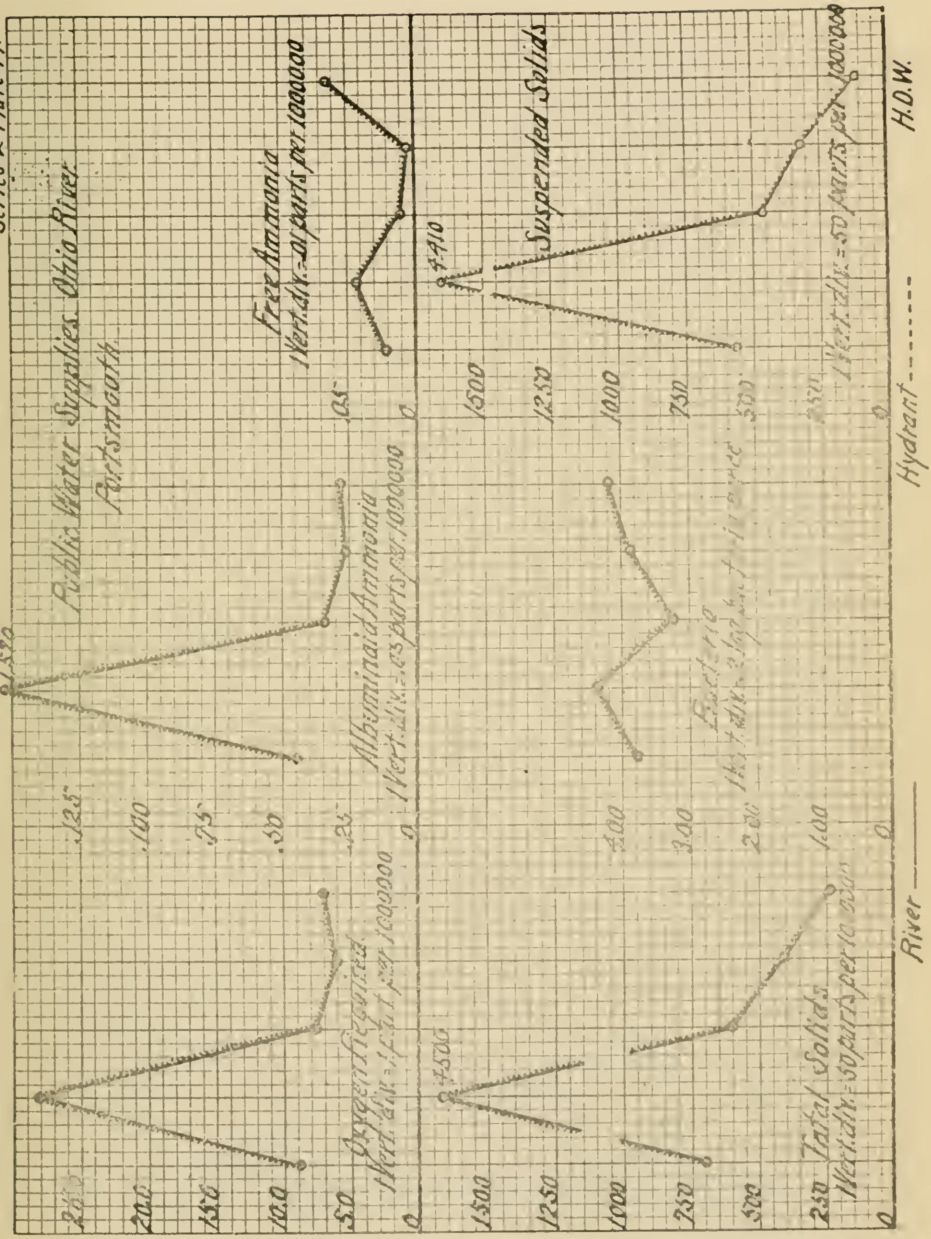


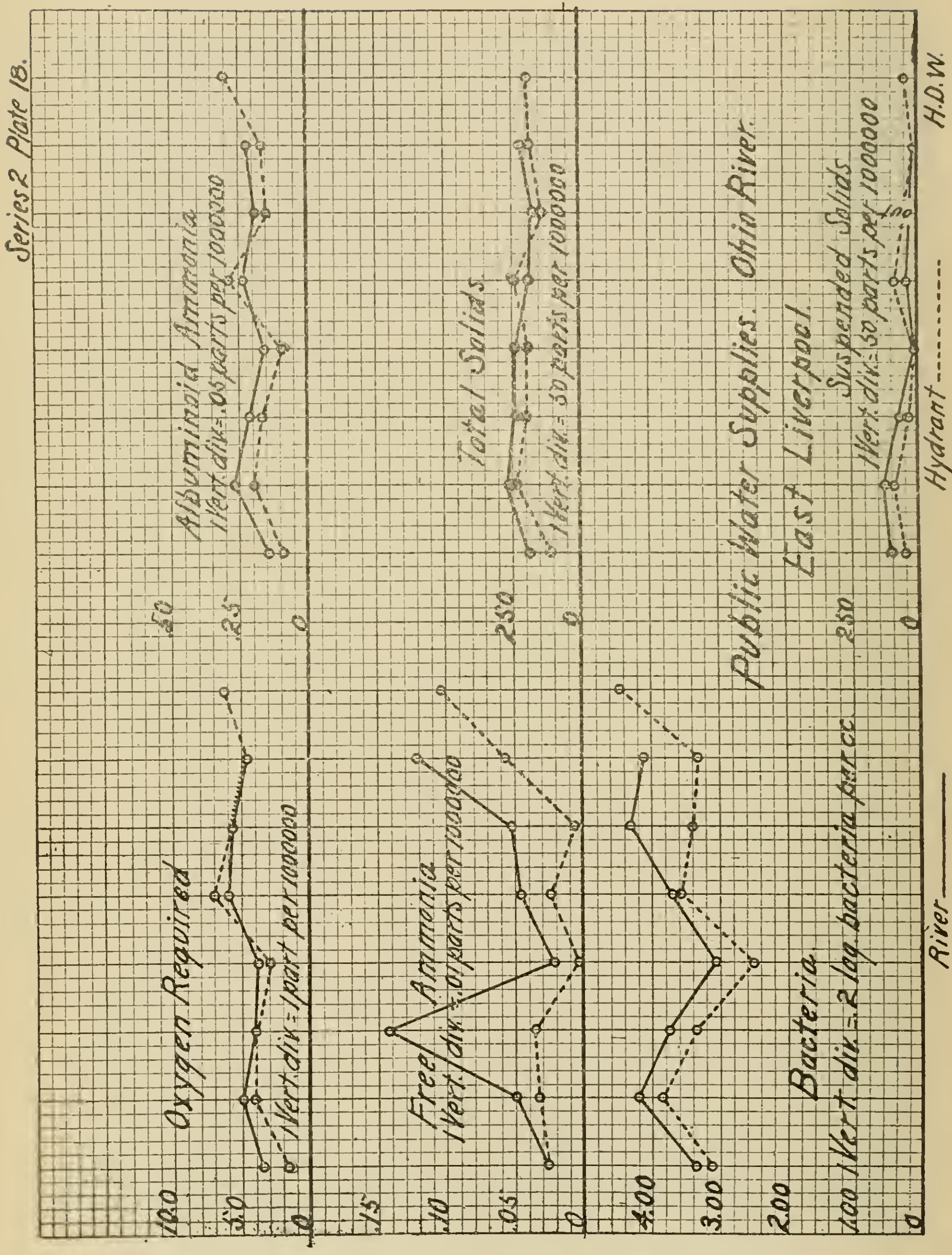

Series 2 Plate 13.
Oxygen Required
1 Vert. div. = 1 part per 1000000
15.0
10.0
0
Albuminoid Ammonia
1 Vert. div. = .05 parts per 1000000
.50
.25
0
Public Water Supplies. Ohio River
Wellsville.
Free Ammonia
1 Vert. div. = .01 parts per 1000000
.20
.15
.10
.05
0
Total Solids
1 Vert. div. = 50 parts per 1000000
1000
750
500
250
0
Bacteria.
1 Vert. div. = .2 log. bacteria per cc
4.00
3.00
2.00
1.00
0
Suspended Solids
1 Vert. div. = 50 parts per 1000000
out
1000
750
500
250
0
River ——
Hydrant - - - - - - -
H.D.W.

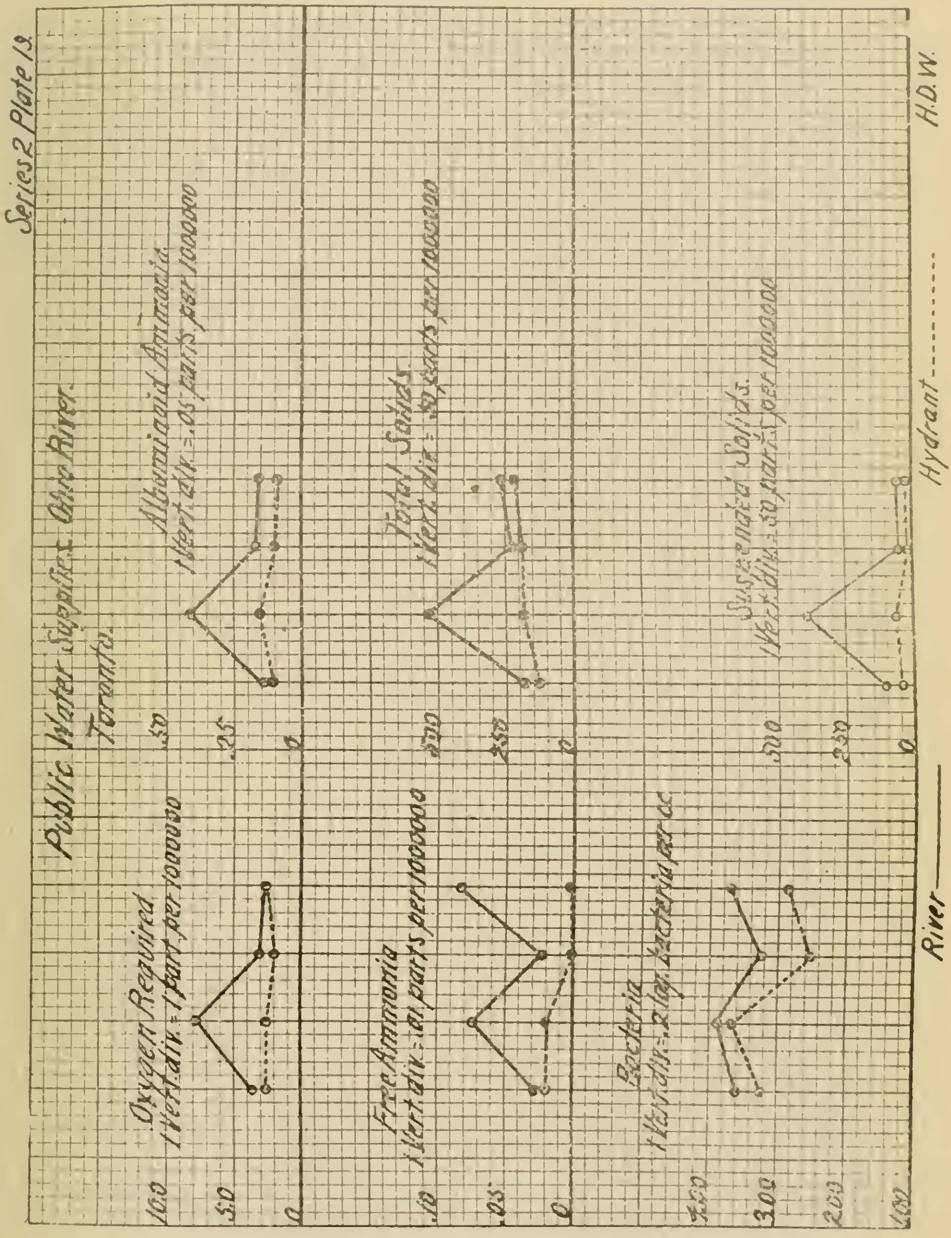

Series 2 Plate 14.
1.8509
Oxygen Required
10.0
1 vert. div. = 1 part per 1000000
5.0
0
Albuminoid Ammonia
.50
1 vert. div. = .05 parts per 1000000
.25
0
.10 Free Ammonia
1 vert. div. = .01 parts per 1000000
.05
0
500 Total Solids
250
1 vert. div. = 50 parts per 1000000
0
Public Water Supplies. Ohio R.
Martins Ferry.
Bacteria
1 Vert. div. = .2 log. of bacteria per cc.
4.00
3.00
2.00
1.00
Suspended Solids
1 Vert. div. = 50 parts per 1000000
250
0
River
Hydrant
H.D.W.


Series 2 Plate 15.
Public Water Supplies. Ohio River.
Bellaire.
Oxygen Required
Vert. Scale 1 div. = 1 part per 1000000.
10.0
5.0
0
Albuminoid Ammonia
1 vert. div. = .05 parts per 1000000
.50
.25
0
Free Ammonia
1 vert. div. = .01 parts per 1000000
.10
.05
0
Total Solids.
1 vert. div. = 50 parts per 1000000.
500
250
0
Bacteria.
1 vert. div. = .2 log. bacteria per cc.
4.00
3.00
2.00
1.00
0
Suspended Solids.
1 vert. div. = 50 parts per 1000000
250
0
River ———
Hydrant ---------
H.D.W.

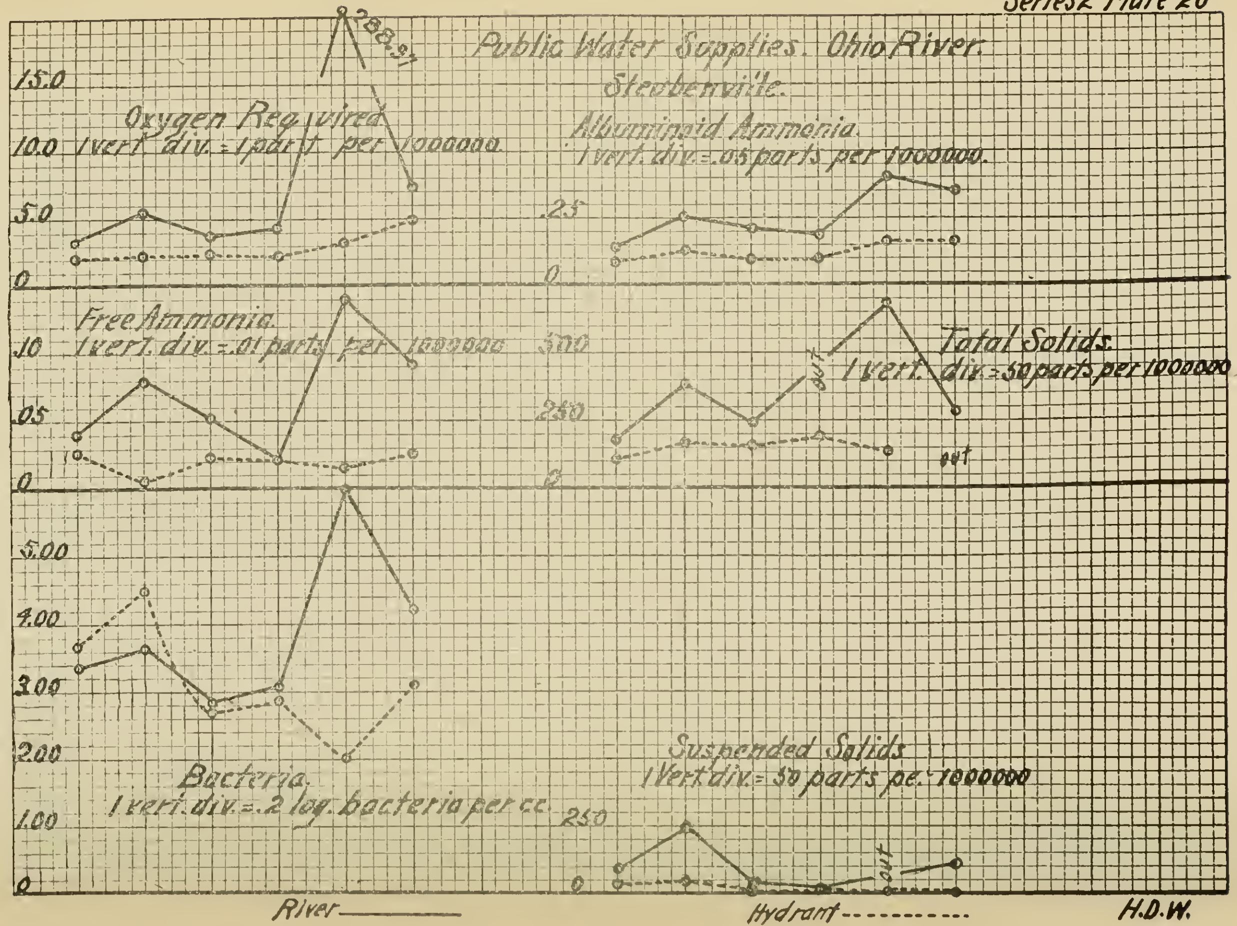

Series 2 Plate 16.
Public Water Supplies. Ohio River.
Ironton.
Oxygen Required
1 Vert. div. = 1 part per 1000000
10.0
5.0
0
Albuminoid Ammonia
1 Vert. div. = .05 parts per 1000000
.25
0
Free Ammonia.
1 Vert. div. = .01 parts per 1000000
.05
0
Total Solids
1 Vert. div. = 50 parts per 1000000
750
500
250
0
Bacteria.
1 Vert. div. = .2 log. bacteria per cc.
4.00
3.00
2.00
1.00
0
Suspended Solids
1 Vert. div. = 50 parts per 1000000
500
250
0
OUT
River
Hydrant
H.D.W.

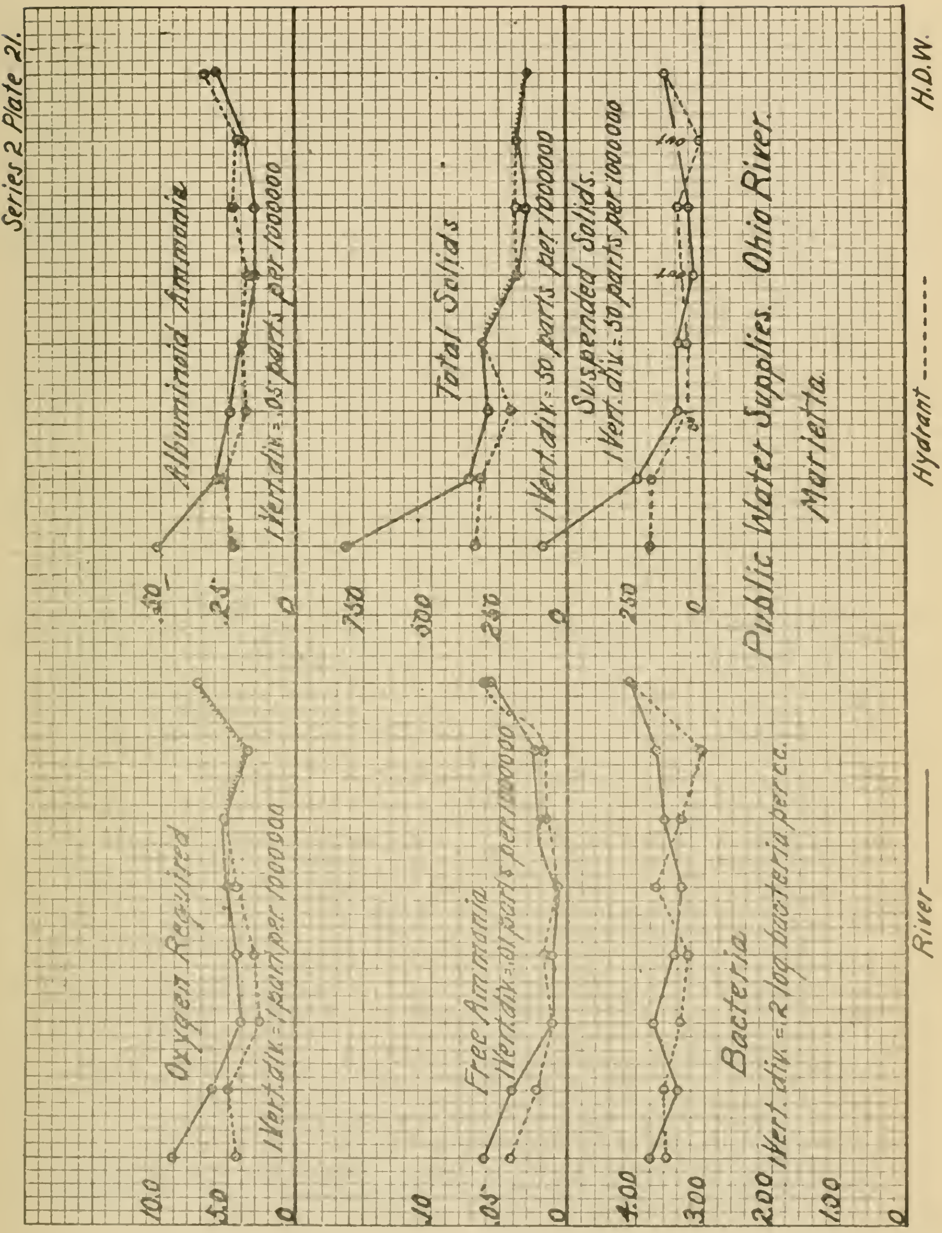

Series 2 Plate 17.
Public Water Supplies Ohio River
Portsmouth
Free Ammonia
1 Vert. div. = .01 parts per 1000000
.05
0
Albuminoid Ammonia
1 Vert. div. = .05 parts per 1000000
1.25
1.00
.75
.50
.25
0
1.550
Oxygen required
1 Vert. div. = .1 part per 1000000
25.0
20.0
15.0
10.0
5.0
0
Suspended Solids
1 Vert. div. = 50 parts per 1000000
4.410
1500
1250
1000
750
500
250
0
4.00
3.00
2.00
1.00
0
Total Solids
1 Vert. div. = 50 parts per 1000000
4.500
1500
1250
1000
750
500
250
0
Hydrant - - - - - -
River ——
H.D.W.


Series 2 Plate 18.
Public Water Supplies. Ohio River.
East Liverpool.
Oxygen Required
1 Vert. div. = 1 part per 1000000
10.0
5.0
0
Albuminoid Ammonia
1 Vert. div. = .05 parts per 1000000
.50
.25
0
Free Ammonia
1 Vert. div. = .01 parts per 1000000
.15
.10
.05
0
Total Solids
1 Vert. div. = 50 parts per 1000000
250
0
Bacteria
1 Vert. div. = 2 log. bacteria per cc.
4.00
3.00
2.00
1.00
0
Suspended Solids
1 Vert. div. = 50 parts per 1000000
250
0
50
River
Hydrant
H.D.W.

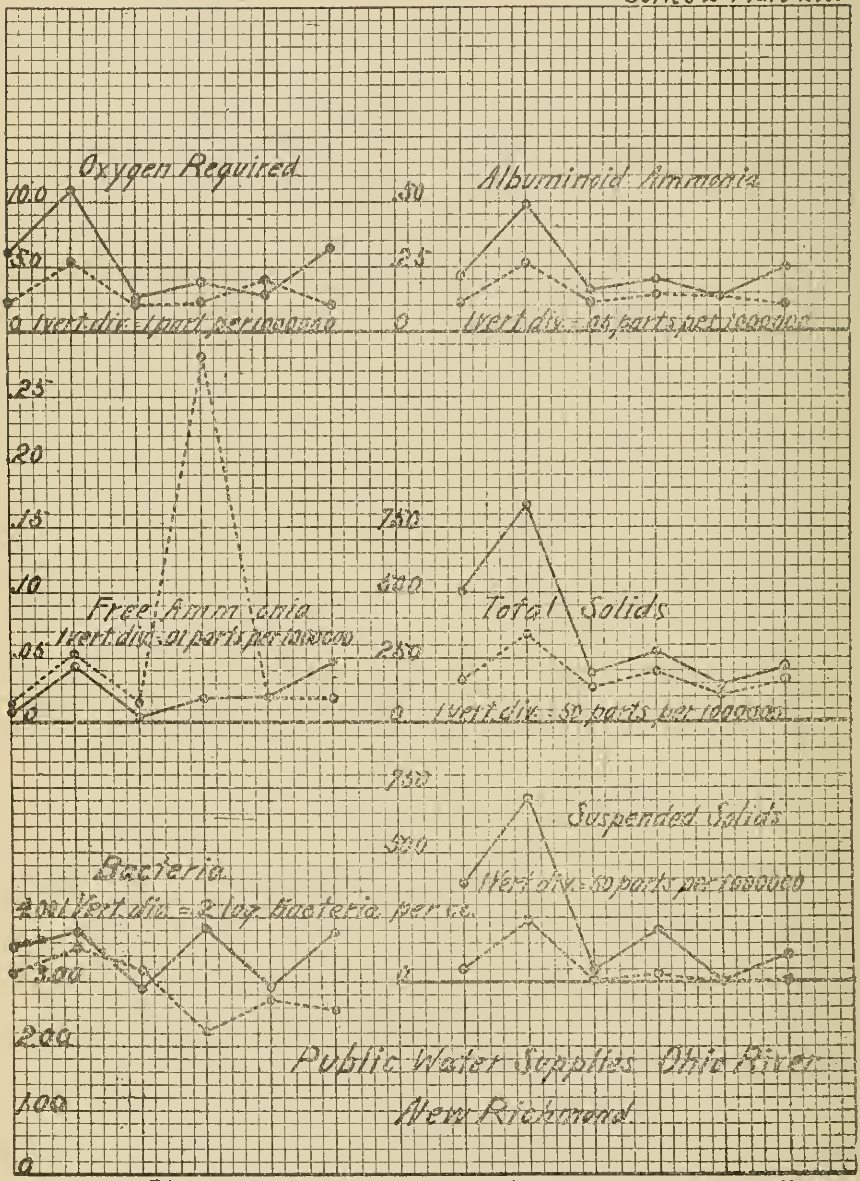

Series 2 Plate 19
Public Water Supplies. Ohio River.
Toronto.
Oxygen Required
1 Vert. div. = 1 part per 1000000
10.0
5.0
0
Albuminoid Ammonia.
1 Vert. div. = .05 parts per 1000000
.50
.25
0
Free Ammonia
1 Vert. div. = .01 parts per 1000000
.10
.05
0
Total Solids.
1 Vert. div. = 50 parts per 1000000
500
250
0
Bacteria
1 Vert. div. = 2 log. bacteria per cc
4.00
3.00
2.00
1.00
Suspended Solids.
1 Vert. div. = 50 parts per 1000000
500
250
0
River
Hydrant
H.D.W.

Series2 Plate 20



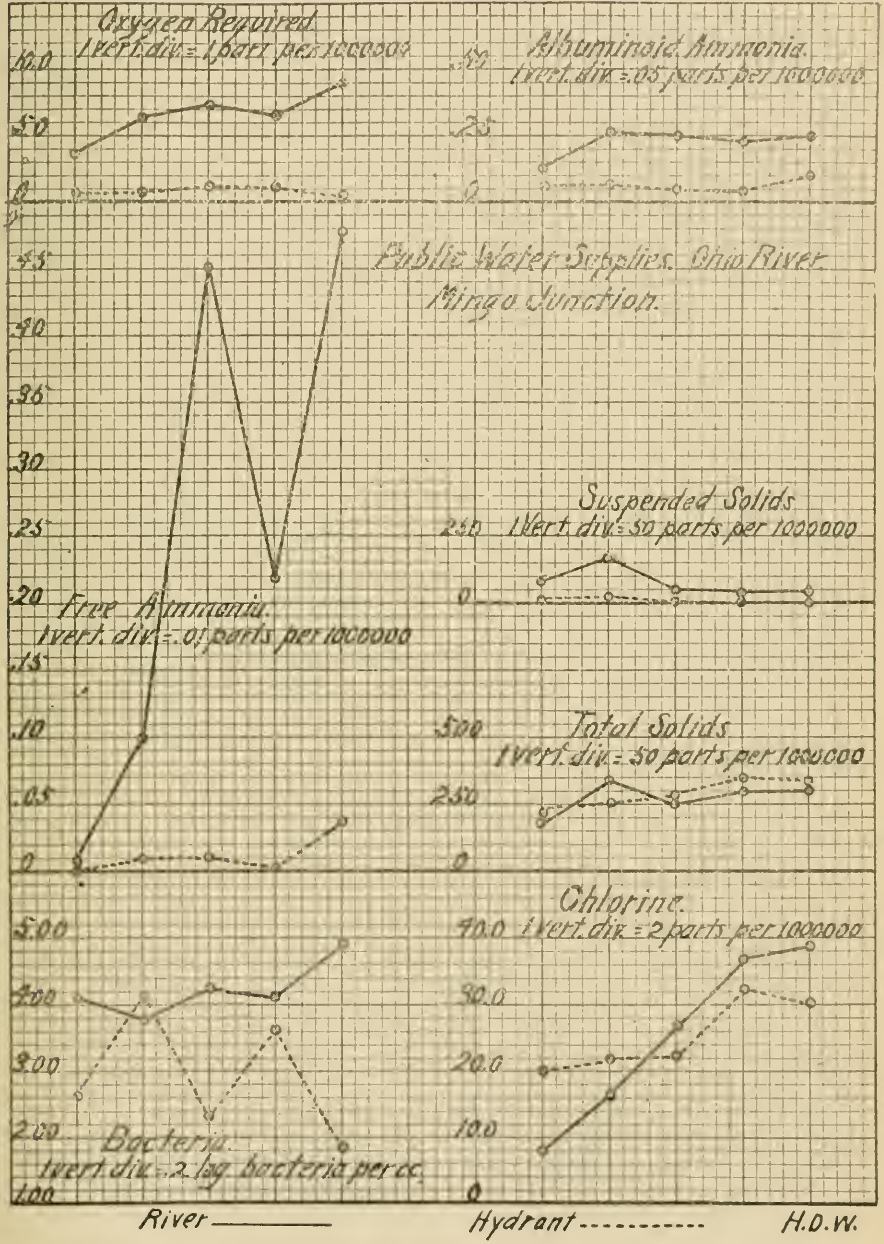

Series 2 Plate 21.
Oxygen Required
1 Vert. div. = 1 part per 1000000
10.0
5.0
0
Albuminoid Ammonia
1 Vert. div. = .05 parts per 1000000
.50
.25
0
Free Ammonia
1 Vert. div. = .01 parts per 1000000
.10
.05
0
Total Solids
1 Vert. div. = 50 parts per 1000000
750
500
250
0
Suspended Solids.
1 Vert. div. = 50 parts per 1000000
250
0
Bacteria
1 Vert. div. = .2 log. bacteria per cc.
4.00
3.00
2.00
1.00
0
Public Water Supplies. Ohio River.
Marietta.
River ———
Hydrant -------
H.D.W.

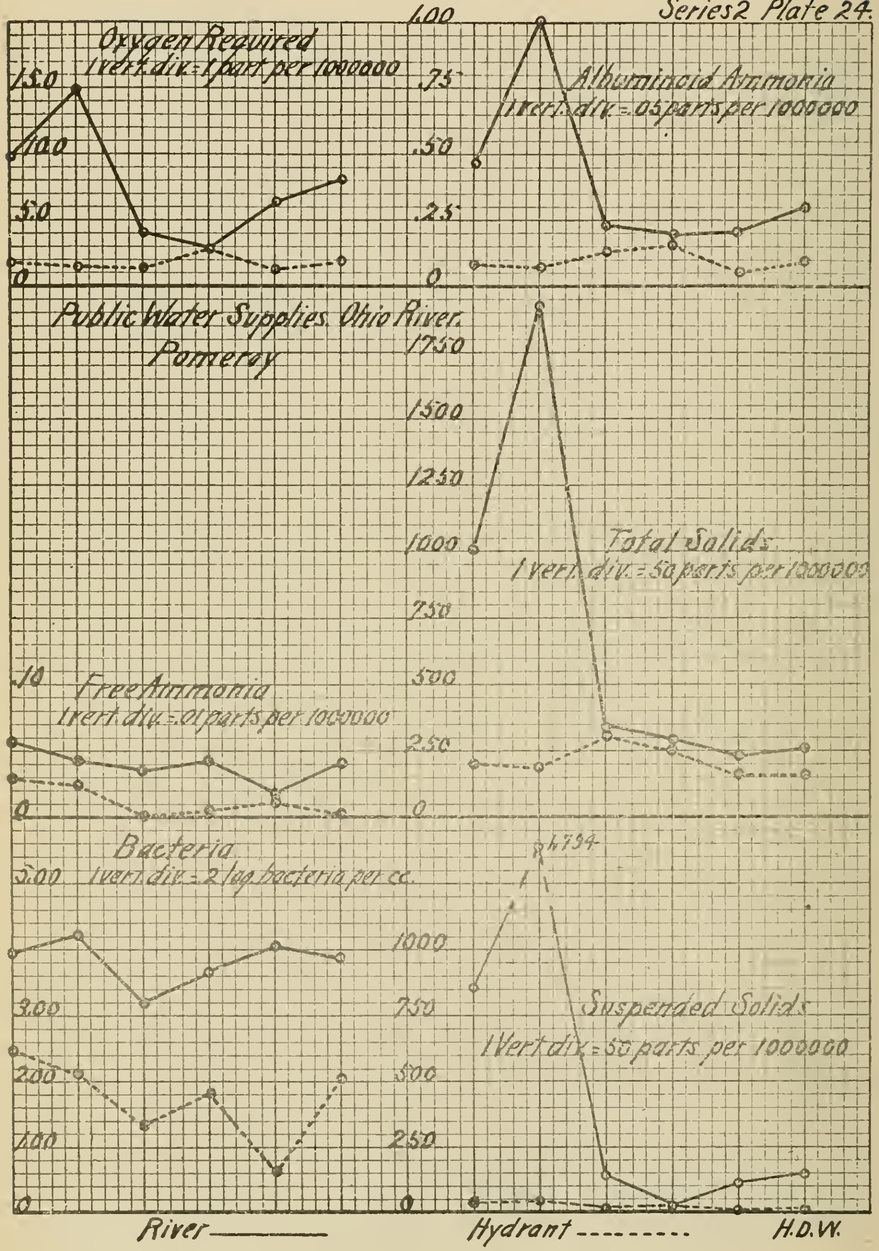
Series 2 Plate 22.

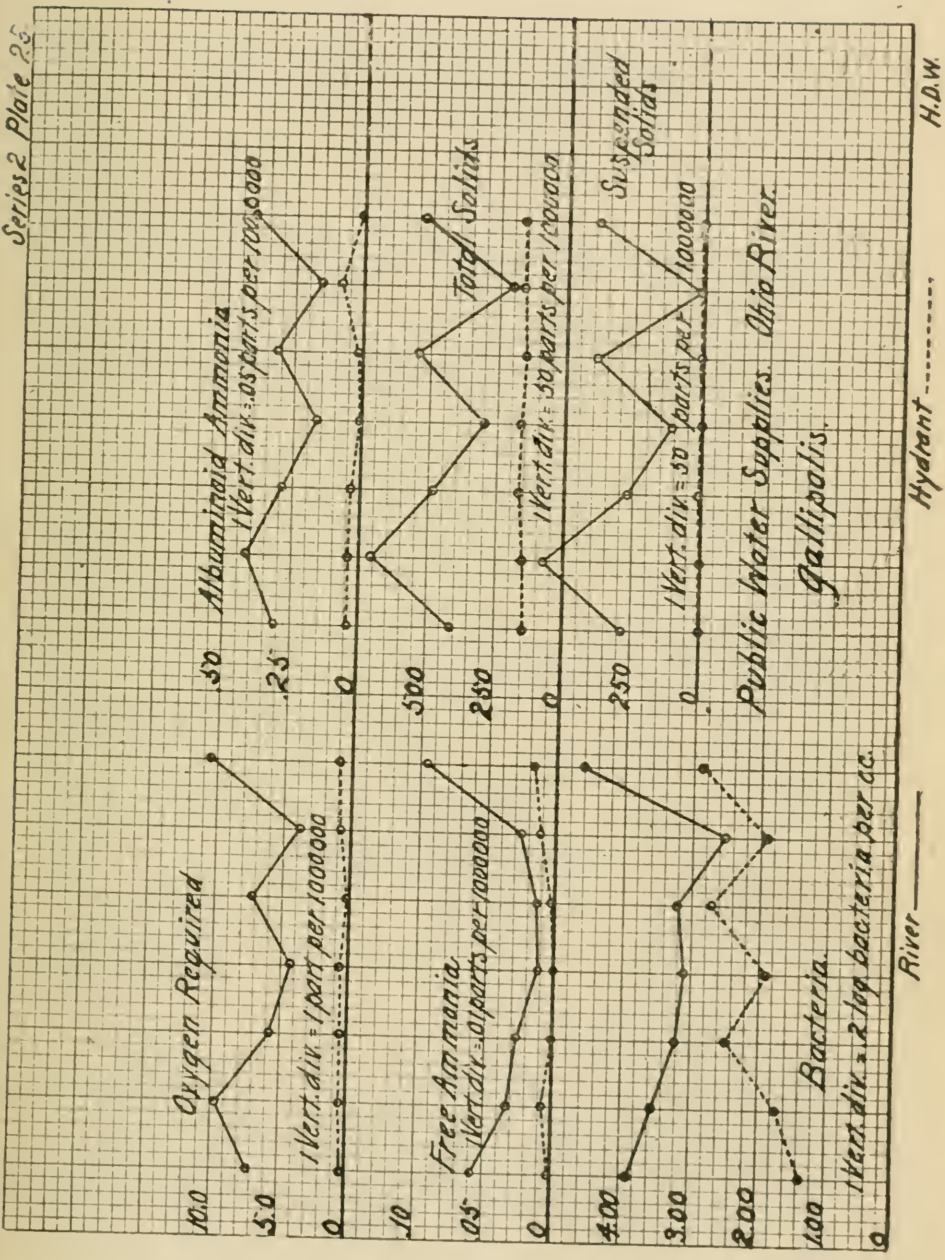


River ———— Hydrant - - - - - - - - - - H.D.W.

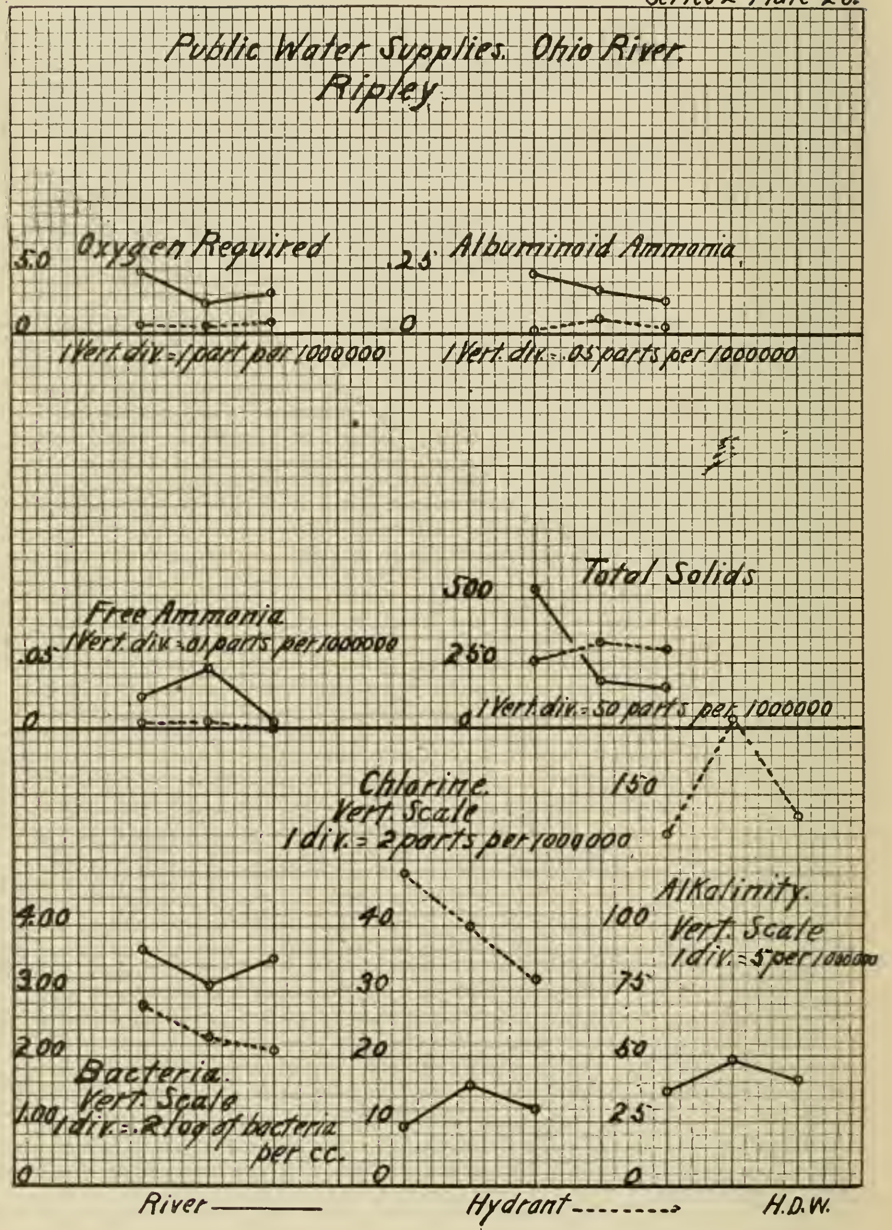
Series 2 Plate 23.




Series 2 Plate 24.
Oxygen Required
1 vert. div. = 1 part per 1000000
15.0
10.0
5.0
0
1.00
.75
.50
.25
0
Albuminoid Ammonia
1 vert. div. = .05 parts per 1000000
Public Water Supplies. Ohio River.
Pomeroy
1750
1500
1250
1000
750
500
250
0
Total Solids
1 vert. div. = 50 parts per 1000000
.10
Free Ammonia
1 vert. div. = .01 parts per 1000000
0
Bacteria
1 vert. div. = 2 log. bacteria per cc.
5.00
3.00
2.00
1.00
0
1734
1000
750
500
250
0
Suspended Solids
1 Vert. div. = 50 parts per 1000000
River ————
Hydrant - - - - - - - -
H.D.W.


Series 2 Plate 25
H.D.W.
Oxygen Required
1 Vert. div. = 1 part per 1000000
10.0
5.0
0
Albuminoid Ammonia
1 Vert. div. = .05 parts per 1000000
.50
.25
0
Free Ammonia
1 Vert. div. = .01 parts per 1000000
.10
.05
0
Total Solids
1 Vert. div. = 50 parts per 1000000
500
250
0
Suspended Solids
1 Vert. div. = 50 parts per 1000000
250
0
Bacteria
1 Vert. div. = .2 log bacteria per cc.
4.00
3.00
2.00
1.00
0
Public Water Supplies. Ohio River.
Gallipolis.
River ———
Hydrant - - - - - -

Series 2 Plate 26.



DISCUSSION OF RESULTS.

CHARACTER OF OHIO RIVER WATER.

The water of the Ohio River as found along the border of this state presents a much mixed product due to the many factors influencing it from sources varying widely in location and nature. The drainage area of this portion of the river comprises parts of Ohio, Pennsylvania, New York, Maryland, West Virginia, Virginia, North Carolina and Kentucky. The several tributaries and sub-tributaries drain all topographies from marsh to mountain, and wash diversified geological formations, prominent among which must be mentioned the clay bearing deposits. In addition to the widely distributed surface washings which eventually reach the main stream there are received in some cases directly, in others indirectly, the waste materials from oil wells, salt wells, coal mines and clay quarries, besides the manufacturing refuse and sanitary sewage of numerous villages and cities.

The considerable volume of water coming from the many tributaries gives rise to a dilution such that the main stream does not become grossly polluted for any distance at specific points, but on the other hand there is always more or less pollution so that the water can not be considered suitable anywhere for general domestic use except it first be purified.

In the matter of suspended solids, this water takes prominent rank. We find that the Ohio River is apt to be quite roily at almost any time below the mouth of the Muskingum River at Marietta. The following streams from the south add greatly to the turbid conditions of the lower Ohio: Little Kanawha, Great Kanawha, Guyandotte, Twelvepole, Big Sandy, Little Saudy, and Tygart.

The variation at different times in the character of the river water is shown by the fluctuation of the curves, plates 1 to 12. The minimum and maximum findings obtained were as follows:

	Minimum.	Maximum.
Oxygen required	2.32	28.03
N. as albuminoid ammonia	.126	1.850
N. as free ammonia	.004	.478
Chlorine	3.1	39.2
Alkalinity	9.	64.
Total solids	128.	4500.
Suspended matter	None.	4406.
Bacteria per c.c.*	375.	1031000.

* Colon bacilli were found in nearly 60 per cent. of the samples.

A. UNTREATED SUPPLIES.

Note. — In the following discussions brief mention only is made of the construction and arrangement of each waterworks plant since full descriptions from the engineering side have been given in the Annual Reports of the Ohio State Board of Health for 1898 and 1899, and in the present volume.

The supplies coming under this head are Wellsville, Martins Ferry, Bellaire, Ironton, and Portsmouth. By referring to the descriptions in the reports quoted above it is seen the first three places named had reservoirs, but these when used are so small compared with the daily consumption that there is almost no sedimentation. Again, pumping direct to the mains from the river does occur at times, as is the case all the time at Ironton and Portsmouth, hence the people of these five cities and villages are practically receiving the Ohio River water in an untreated condition.

Wellsville. Since this town is using the untreated water of the river but three miles below the introduction of East Liverpool sewage, it is evident from inspection as well as from the analyses that the supply is an unsafe one. In addition, while the water is not so unsightly as that in the later course of the stream, yet compared with our ordinary streams it is roily much of the time, and the findings indicate the muddiest water in the upper portion (above Marietta) of the Ohio occurs in the neighborhood of Wellsville. The high amounts of suspended matter in the samples of June 24 and September 6 show, by comparison with the East Liverpool samples, that there is a decided addition of local soil between the two places. One source is evidently the clay bearing water of Little Yellow Creek.

The following minimum and maximum findings from the eight samples give some idea of the variation occurring in the Wellsville water supply:

	Minimum.	Maximum.
Oxygen required	3.67	14.93
N. as albuminoid ammonia	.134	.528
N. as free ammonia	.007	.086
Suspended matter	5.	1,083.
Bacteria per c.c.	450.	11,200.
Alkalinity	11.	37.

These fluctuations are well shown in plate 13.

With such low alkalinities and high suspended matter it is seen that filtration would have to be intelligently conducted in order to yield a wholly satisfactory effluent. It needs additional investigation to learn whether the more disturbed conditions of the river extended over sufficiently long periods of time to interfere with practical subsidence and English filtration. The average of the coefficients of turbidity determined by us at Wellsville was .78, indicating a fairly coarse sediment. The little sedimentation work tried showed a reduction of 86 per cent in the suspended solids after 72 hours subsidence.

The authorities at Wellsville are cognizant of the undesirable and unsafe conditions attending the present supply and steps have been taken to secure an improved one.

Martins Ferry. (Plate 14). Unlike the city just discussed the present one is removed from the disturbing influence of the addition of East Liverpool sewage and the at times roily water of Little Yellow Creek. and there is therefore not so much fluctuation in the character of the hydrant water. The amount of suspended matter was the lowest for this group giving an average of 62 and a maximum of 217. The minimum and maximum findings for the six samples were as follows:

	Minimum.	Maximum.
Oxygen required	2.38	5.78
N. as albuminoid ammonia	.140	1.850a
N. as free ammonia	.008	.052
Suspended matter	3.	217.
Bacteria per c.c.	550.	10,200.

The occurrence of so much nitrogenous matter as was indicated by the albuminoid ammonia (a) for December is doubtless a very unusual occurrence, for the next highest finding was .298. While this water is better than that at Wellsville we must still say it is open to serious objections when considered as a public supply.

Bellaire. Because a reservoir is included in the system at Bellaire, river and hydrant samples were taken at the first three collections, but the latter showed so little improvement (See plate 15) that no further samples were taken from the river, and Bellaire is classed with the group of supplies using an untreated water.

The results show that at Bellaire as at Martins Ferry there is not the local suspended matter that troubles Wellsville nor the general suspended matter found in the river at points below Marietta. Hence among the untreated supplies, Bellaire enjoys next to the clearest — although their water is not clear as indicated by an average turbidity of 165 (silica standard) and an average suspended matter of 90 milligrams to the liter.

As stated in the 1898 report, the water supply at Bellaire is open to pollution by the nearby sewages of Martins Ferry, Bridgeport, Wheeling, and Wheeling Island. In addition, part of the Bellaire sewage may reach the intake pipe. While some of the samples gave notice of this sewage influence, yet others did not reveal such indicative findings as one would expect in view of the opportunity for pollution. There are local conditions, currents, eddies, small tributaries, etc., and a closer study of these is needed to fully understand why some of the samples gave this lessened evidence of pollution. However, since some of the samples bear out the known conditions of pollution, this supply is sometimes bad, and is moreover open at all times to danger, therefore it can neither be called a satisfactory nor a safe public supply. The minimum and maximum findings for some of the determinations are:

	Minimum.	Maximum.
Oxygen required	2.57	6.95
N. as albuminoid ammonia	.108	.314
N. as free ammonia	.008	.070
Suspended matter	28.	208.
Bacteria per c.c	1,100.	10,500.

Ironton. Since the public supply of this city is pumped directly from river to faucet a glance at the curves on plate 16 gives an idea of the character of the water obtained. The opportunities for sewage pollution are various and are stated at length in the report on the Ironton supply, page 514, Annual Report of Ohio State Board of Health for 1898.

In addition to the amount of organic matter carried by this water, there is much silt and especially clay as shown by the turbidities and suspended solids the averages of which were respectively 615 and 317. The writer is informed by an observant resident of Ironton that he has noticed in the past twenty-five years a gradual lessening in the lengths of clear water periods in the river. He attributes this change to more ready drainage by surface washings due to the removal of underbrush, to the clearing up and cultivation of the soil, and to the development of the mining industries along the larger tributaries entering the river from West Virginia. The following are the extreme findings at Ironton in the five samples received:

	Minimum.	Maximum.
Turbidity	111.	1,632.
Oxygen required	3.47	10.25
N. as albuminoid ammonia	.164	.404
N. as free ammonia	.006	.082
Suspended solids	42.	572.
Bacteria per c.c	1,500.	7,200.
Coefficient of turbidity	.38	1.24

Attention is called to the amounts of suspended matter and its fineness at times as these would be important factors in purification by subsidence and filtration. Much additional information is needed of the conditions obtaining in the river at this city and at the one next to be discussed.

Portsmouth. This water supply is something like the preceding, — the main differences being that the Portsmouth samples reveal a little less direct sewage influence, but an even greater one from suspended soils. There is however enough sewage pollution so that the water cannot be called a safe one for general usage.

The wide range of fluctuation is seen on plate 17, as also by the following minimum and maximum findings although but five samples were obtained from this city:

	Minimum.	Maximum.
Oxygen required	6.14	28.03
N. as albuminoid ammonia	.268	1.570
N. as free ammonia	.006	.066
Suspended matter	108.	4,406.
Bacteria per c.c.	1,900.	26,000.
Turbidity	153.	13,068. (?)
Coefficient of turbidity	.21	.71

It is to be hoped the sample of June 27 was one of extremely rare occurrence. Certainly the obtaining of such a water from a faucet in the public supply of a prosperous and growing city with a population of nearly 18,000 is a unique experience. The turbidity of the sample is given as computed but of course is not a reliable finding. It would have been interesting to know more closely the turbidity of a water so loaded with fine clay as to require a dilution of 1:19 with distilled water to enable a platinum wire (.04 inch diam.) to be seen at a depth of one inch. The sample contained 1 part of suspended matter in 227 parts of water, and was the result of the heavy rains which had fallen on the many clay bearing areas contributing to the Ohio River above Portsmouth. Reference to the United States Weather Bureau reports shows general heavy rains covering much of the fortnight preceding the collection of this sample.

A resident of Portsmouth claimed the river was clear less than one-third of the time, which is better than might be expected from the geographical and topographical conditions involved. With such an amount of foreign matter present, and so in evidence as not to require the technique of a chemical analysis for proof, it does seem this thriving city would at once seek to improve its water supply.

B. SUBSIDED SUPPLIES.

We find five villages and cities making use of this method of treatment, viz., East Liverpool, Toronto, Steubenville, Marietta, and New Richmond.

East Liverpool. For a full description of the supply see page 512, 1898 report. Two reservoirs have been employed with a combined capacity of 4,000,000 gallons, the consumption being about one-half as great. At the time of the December sampling a break had occurred in the reservoir system, and river water was being pumped direct to the mains, therefore only a hydrant sample was taken. This accident and the consequent absence of any attempt at purification should be remembered in consulting plate 18, else the higher points for December in the hydrant curve would be misleading. A third reservoir has recently been constructed.

By the general direction of the curves of this plate, it is seen a greater variation occurs in the amount of organic matter than in the total solids, which is the reverse of what occurs in most portions of the stream as shown elsewhere. The small range from almost no turbidity to 249, with suspended solids reaching only 110, shows the river at East Liverpool is a very different stream as regards soil content from what it is 200 or 300 miles later in its course. This is seen by comparing the flat curve for solids, plate 18, with the solids on plates 16, 17, 24, 25 and others. The samples of September 4th were taken just after a rise in the river, so that the reservoir water was worse than the river — as the latter had begun to improve after the freshet. This accounts for the hydrant curve appearing above the river curve.

In comparing the two sets of samples to obtain the efficiency of the treatment it would be unfair to include the December sample taken when the reservoir was by accident out of use, but the December result is included in judging the quality of the water, as the people had that water to use for a time. The hydrant water on the average showed the following improvement over the river water:

Oxygen required	9%
N. as albuminoid ammonia	19%
Suspended matter	15%
Bacteria	70%

The last result is probably higher than it would be with a more extended series of investigations. In the hydrant water *B. coli* was found only 20 per cent as often as in the untreated water. Again referring to plate 18 and to the following partial list of minimum and maximum findings it is seen that while the hydrant water shows an improvement, yet it cannot be called a satisfactory one for the purification is not extensive enough nor reliable enough to yield a usable water at all times.

	Minimum.	Maximum.
Oxygen required	1.71	6.96
N. as albuminoid ammonia	.086	.302
N. as free ammonia	.007	.104
Suspended matter	None.	95.
Bacteria per c.c.	300.	28,900.
Alkalinity	8.	39.

Attention is called to the low alkalinity of the water at East Liverpool in connection with any consideration of a process involving the use of a coagulant. It is also to be noted that it is possibly at East Liverpool that the Ohio River (as regards the state of Ohio) will be found to attain the lowest maximum amount of suspended soil.

Toronto. After the request was made to collect samples not on a specified day but whenever any of certain conditions existed, no samples were received from Toronto, hence the work there only includes four sets of samples. A description of the system with its pump well filled by gravity from the river, whence the water is pumped to the relatively large reservoir may be found on page 520 of the 1898 report.

Considering the condition of the river as to the organic and inorganic matter contained, it may be said the village of Toronto is one of the better situated ones for the obtaining of a usable water. In addition to the natural location, the arrangement at the intake pipe provides some straining action, while the large reservoir holds from an eight to ten days' supply, which allows full sedimentation, and avoids the necessity of filling the reservoir when the river water is at its worst.

The low flat curves of the hydrant water, plate 19, indicate, as do the following extreme findings, the improved condition of the water as it is delivered to the citizens of Toronto:

	Minimum.	Maximum.
Oxygen required	2.19	2.94
N. as albuminoid ammonia	.100	.150
N. as free ammonia	.002	.024
Suspended solids	16.	63.
Bacteria per c.c.	375.	5,200.

Colon bacilli were not obtained from any of the four hydrant samples. The results indicate a usable water. The following are the percentages of improvement by averages:

Oxygen required	42%
N. as albuminoid ammonia	45%
Suspended matter	75%
Bacteria	58%

Steubenville. For a full description of the plant and the three reservoirs the reader is referred to the annual report for 1898, page 518. Like the preceding village, the city of Steubenville occupies one of the favorable locations for obtaining Ohio River water relatively free from organic and inorganic pollutions. In addition, advantage has been taken of opportunity to so locate the mouth of the intake pipe as to avoid the heavier suspended matters which go half rolling, half floating along at the bottom of the river, and on the other hand the light material carried at the surface. The mouth of the intake pipe is located in a deep portion of the river so as to be some twelve feet above the bed of the river and yet eight feet below the surface at low water. In July, through the kindness of Mr. S. B. Curfman, superintendent of the Steubenville Waterworks, two samples were taken, one representing the water at the surface, the other at the mouth of the intake pipe. The latter gave these percentages of reduction from the former: Oxygen required 11 per cent, albuminoid ammonia 11 per cent, bacteria 43 per cent. This was only a single test and of course the percentages do not hold for varied conditions, but it shows there are times when such a location of an intake pipe will be helpful in securing good results.

Steubenville with its greater consumption has not a storage capacity for an eight to ten days' supply as was found at Toronto, but instead, for barely one-third as long. Some fluctuation occurs in the quality of the city water owing to location in the city, since the high pressure service of the city is derived from the first reservoir and the low pressure service from the third reservoir.

In the April and June samples the numbers of bacteria in the hydrant samples were very high, the former twice that of the river, and the latter seven times as many. These two abnormal findings raise the average number of bacteria in the hydrant water above the average in the river. With the exceptions noted, the relatively low flat hydrant curves (plate 20), and the following figures, indicate the water at Steubenville is usable although not wholly acceptable:

	Minimum.	Maximum.	Average.
Oxygen required	2.10	5.01	2.92
N. as albuminoid ammonia	.094	.174	.129
N. as free ammonia	.008	.029	.021
Suspended matter	None.	43.	13.
Bacteria per c.c.	115.	30000. 1200*	6,300. 2,700*

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* Omitting April and June bacterial findings of hydrant water. Colon bacilli were not found in the six samples of hydrant water.

The collector was unable to secure a boat for taking the river sample of October 9th, and that sample, obtained near shore, was so obviously polluted by local surroundings as not to be a representative sample and is not included in computing the efficiency attained by the system in operation at Steubenville. The percentages of removal were found to be as follows:

Oxygen as required	40%
N. as albuminoid ammonia	44%
Suspended matter	87%
Bacteria	? 49%*

---

* Bacterial reduction with April and June bacterial findings omitted as stated above.

The percentage of suspended matter removed is a little high as some of the samples contained so very little turbidity the suspended solids were called none without determination. Judged by the available information at hand it would appear with the favorable character of the raw water, the favorable location of the intake, and the intelligent supervision which this plant evidently receives, there is obtained approximately the best results at Steubenville that may be expected by plain subsidence of the Ohio River without providing a greater storage than a three days' supply. It is of course obvious that the increased storage allows cessation from pumping at those times when the river is for a short period in an unusual and undesirable condition.

Marietta. See 1898 report, page 515. The water is pumped from the river to two steel tanks on the hills back of the city. While the capacity of the tanks is but little more than the consumption, yet some improvement is found between the two sets of samples. This city is happily located as regards removal of sewage pollution from her water supply, the nearest sources of importance being Bellaire and Wheeling, some seventy-five miles up the river. Fortunately, also the more serious clay pollutions of the Ohio River begin below the Marietta intake with the incoming of Muskingum River, whose waters at times are very turbid with suspended clay, as shown by our studies in 1899.

A consideration of the stages* of the Ohio River at Mariettta during 1901, the rainfall data obtained from the U. S. Weather Bureau reports, and the dates of collections of the present samples indicate that muddier water does sometimes appear at Marietta than was obtained by us. However, we believe the water is rarely more than moderately roily, but on the other hand it appears to be seldom clearer than a turbidity of 40 indicates. The average of the coefficients of turbidity is .99 and indicates a coarser sediment than is found at most of the places in the present study. The majority of the waters received from Marietta could have been handled by either English or American filtration without previous subsidence or only such brief sedimentation as occurs in the present system, but some probably could not have been so handled without further sedimentation or an increased alkalinity. In the light of information at hand concerning the sources of the suspended matter so troublesome at other points, and the various analyses present and past, it would appear that there are probably few days in the year when the river water could not be handled by English filtration preceded by preliminary subsidence. The limited subsidence work on the Marietta waters gave good percentages of reduction in suspended matter, and it is likely the subsided water could also be handled with a coagulant and without artificially increasing the alkalinity, but closest attention would be demanded as to the amount of coagulant used and the alkalinity of the water to be treated. The alkalinities at Marietta during the present investigation were somewhat lower than in 1899. Additional information along these lines is greatly to be desired.

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*Kindly furnished us by Major W. H. Bixby, Corps of Engineers, U. S. A.

It is fortunate for the citizens of Marietta that the quality of the river water at their door is no worse, for the amount of purification is small as graphically shown on plate 21, and also by the following percentages:

Oxygen required	20%
N. as albuminoid ammonia	9%
Suspended matter	40%
Bacteria	23%

During the latter part of the season each hydrant sample was a little higher in albuminoid ammonia than the corresponding river sample, hence the low percentage of removal noted above.

The flat curves on the plate and the following figures indicate the relatively uniform condition of the city water:

	Minimum.	Maximum.
Oxygen required	2.79	7.12
N. as albuminoid ammonia	.172	.334
N. as free ammonia	.011	.062
Suspended solids	11.	200.
Turbidity	46.	429.
Bacteria per c.c.	1,100.	12,000.

The hydrant water at Marietta, judged by the information before us, is usable at times, suspicious at others, and frequently unsatisfactory.

We are informed steps have been taken toward an improved supply for this thriving city.

New Richmond. This water supply is one of the newer ones, having been installed in 1899. See 1899 report, page 122. The capacity of the reservoir to which the river water is pumped for sedimentation and storage is 700,000 gallons while the daily consumption is reported as 30,000 gallons, thus affording full opportunity for sedimentation. The analyses gave the following percentages of removal in the hydrant water:

Oxygen required	47%
N. as albuminoid ammonia	39%
Suspended matter	79%
Bacteria	70%

With the exception of the suspended matter these results are not as good as those obtained by Fuller with plain subsidence at Cincinnati in seventy-two hours.

From the results of the samples taken June 29th it appears a very muddy water had been pumped to the reservoir. Tis was by far the muddiest hydrant sample received from New Richmond and with such long storage available would ordinarily not need to occur except in case of accident. The free ammonia was as high or higher in the hydrant water than in the river each time except the last. On August 19th it was extraordinarily high and not accompanied by a similar fluctuation in the other determinations. The minimum and maximum findings were as follows:

	Minimum.	Maximum.
Oxygen required	1.98	5.38 3.77a
N. as albuminoid ammonia	160.	.256 .142a
N. as free ammonia	.007	.280b .052
Suspended matter	None.	236. 50.a
Bacteria per c.c.	160.	3.200. 1,400.a

a Omitting June 29.
b Omitting August 19.

Colon bacilli were not obtained in the hydrant water and with the exceptions noted the water would be classed as usable and quite uniform in character as shown by the flat dotted curves on plate 22.

C. FILTERED SUPPLIES.

The Ohio River supplies that may be said to obtain filtered waters are Mingo Junction, Gallipolis, and Pomeroy. Ripley obtains ground water.

Mingo Junction. This plant is somewhat differently constructed from any other in Ohio on this river, and a full description may be found on page 119 of the 1898 annual report.

The intake consists of a wooden crib 40 feet long, 8 feet wide, and 4 feet deep, with tight top, open bottom, slotted ends and slotted sides. This filtering crib was submerged in an excavated trench in the bottom of the river and covered with 6 feet of gravel. An eight-inch suction pipe from the pumping station enters one side of the crib 18 inches below the top. The water is pumped to a 400,000 gallon reservoir on the hill whence the city is supplied by gravity. It was the expectation of the company to obtain filtered river water, but the analyses shows that at least only a portion of the water thus obtained is river water. The high nitrates of the city water, the increased alkalinities and incrusting constituents, and the course of the chlorine findings indicate a considerable influx of subsoil water. It will be noticed the alkalinities and incrusting constituents of the hydrant are on the average very nearly double those of the river water and do not show such a seasonal variation. In the spring months, under the influence of dilution, the river chlorides were much lower than those in the hydrant, while in the later months in the absence of dilution a reversed relation appeared. Since subsoil waters do not show such a seasonal variation in chlorides, as do streams, attention is called to the curves for chlorine on plate 23.

In the absence of information at present as to the mineral character of the ground water at Mingo Junction, we do not know what the proportions of ground and river water are in the supply at Mingo Junction. Suffice it to say if any considerable amount is river water, then the ground water must contain much evidence of "past pollution."

Remembering this presence of ground water in the public supply it is easy to understand,

1st. The low points for Mingo Junction on the dotted curves of plates 1-12, and the low findings they represent.

2d. The higher mineral findings and total solids in the city water when not counterbalanced by suspended matter in the river.

3rd. The misleading conception of the efficiency of this filtration of the river water if the figures in the table, or the curves of plate 23, be considered regardless of local conditions. The figures alone give the following reductions:

Oxygen required	86%
N. as albuminoid ammonia	71%
N. as free ammonia	95%
Suspended matter	86%
Bacteria	85%

As stated, these percentages are misleading.

The amount of suspended matter in the river here is low, influenced to some extent, perhaps, by the industrial wastes at Steubenville, and one would not expect serious difficulty in obtaining a clear effluent by sand filtration. Occasional slight turbidities and higher bacterial contents in the hydrant water are factors suggestive of a faulty filtration. These do occur at Mingo Junction.

Summing up the character of the hydrant water we may say it is a mixture of ground water and filtered river water. It is usually clear and palatable, but for laundry use is somewhat harder than the river water. It contains more scale forming material, but, in actual boiler use, may be found preferable to the muddier river water which may also at times contain additional objectionable material from Steubenville. The "past pollution" shown in the city samples is not a serious matter *so long as efficient purification is attained* before the water reaches the crib, but should the purification become deficient, or the pollution more direct, trouble might ensue. The water of the Mingo Junction supply would therefore be classed as potable with the shadow of danger resting upon it, for should the stream wash the gravel away from some portion of the crib the very close proximity of Steubenville sewage means serious danger. On the other hand the village of Mingo Junction is not sewered, and the crib situated opposite the center of town is well located for reaping the full benefit of the subsoil drainage of the unsewered village. The following are the minimum and maximum findings obtained in the five hydrant samples received. Colon bacilli were not found:

	Minimum.	Maximum.
Oxygen required	.58	1.28
N. as albuminoid ammonia	.048	.099
N. as free ammonia	.004	.037
N. as nitrates	2.67	4.82
Suspended matter	None.	34.
Bacteria per c.c.	75.	13,800.

Pomeroy. This water supply was installed in 1899 and a full description may be found on page 126 of the annual report of the Ohio State Board of Health for 1899. In brief, the water is pumped from the river to a sedimentation tank (230,000 gallons capacity), then passed through a Wetheril mechanical filter, and pumped to the storage reservoir (275,000 gallons capacity) from which the villages of Pomeroy and Middleport are supplied by gravity. The plant was orginally intended for operation without a coagulant, but the condition of the river made this impossible and now at times sulphate of alumina is employed.

Since we have at Pomeroy the only type of mechanical filter at present in the state handling Ohio River water, the results are of much interest. The river at Pomeroy is not seriously polluted with sewage, but it does contain some sewage with widely varying quantities of vegetative organic matter, and especially of suspended soils, the latter being the greatest obstacle to the securing of a clear and potable water. In the samples received at varying intervals for eight months, the average weight of suspended matter was 514 mgms. to the liter with minimum and maximum findings of 22 and 1794. The coefficient of turbidity ranged from .21 to 1.68. These facts show why it was necessary to employ a coagulant, and why considerable of it was necessary at times. As the alkalinity serves as a measure of the ability of the water to decompose the coagulant, we note an average alkalinity of 34 with a minimum of 14. In a more extended series of investigations the river might show a lower minimum alkalinity.

Sufficient data are not at hand to show whether the lower alkalinities occur in such relation to the suspended matters as to prevent, at times, the successful operation of the plant, as now arranged, without artificially increasing the alkalinity, provided close attention was paid to this feature of the question, and to pumping as far as possible only at the more opportune stages of the river. By a successful operation of the plant is meant the production of a clear effluent containing comparatively few bacteria and no undecomposed alum. It is evident that, with the river so low in carbonates of lime and magnesia, and so heavily charged with silt and fine clay, the plant at Pomeroy has to labor under unusual difficulties. It is likewise manifest that close attention must be paid to the alkalinity of the untreated water and the amount of alum added or there will appear in the effluent at times undecomposed alum — a condition not permissible.

When the difficulties at Pomeroy became known to us through the analyses, and also that alum occasionally appeared in the effluent of an otherwise clear, good, soft water (a combination not easy to obtain in Ohio), a communication was addressed to the superintendent of the waterworks at Pomeroy laying the matter before the waterworks company, thus enabling them to meet and correct this defect now that its presence had been recognized. At the present writing we have not been informed what steps have been taken by the Waterworks Company, but no doubt the evil has been remedied, and thus a good supply of water retained to the citizens of Pomeroy and Middleport.

It is said no coagulant is used at times, and the results of the analyses attest the truthfulness of the statement. Had a little been used, some of the samples would have shown greater percentages of improvement. The average removals were:

Oxygen required	78%
N. as albuminoid ammonia	75%
Suspended matter	97%
Bacteria	99%

The extent of purification is also well shown by the curves of plate 24. In that connection it should be remembered the number of bacteria, (because of wide range) is plotted to logarithms, thus belittling the extent of purification in the graphical presentation; e. g., the bacterial findings of May 27th were 8400 and 275, yet the logarithm of the latter is about five-eighths as great as for the former.

The good character of the hydrant water with the exceptions elsewhere noted are shown by the following findings:

	Minimum.	Maximum.	Average.
Oxygen required	1.27	2.88a	1.80
N. as albuminoid ammonia	.063	.162a	.101
N. as free ammonia	None.	.029	.012
Suspended matter	None.	37.	14.
Bacteria per c.c.	4.	275.	99.

a No coagulant in use.

Colon bacilli were not found in the hydrant samples, but alum was tested for and found present in samples Nos. 1728, 1787 and 2041.

In addition to the regular samples, twelve special samples were taken of the hydrant water and tested for alkalinity as a preliminary step to see if sufficient alum had been used to overcome the alkalinity. A margin of alkalinity remained but it was low in some cases as shown by the following table of special hydrant samples from Pomeroy:

No. of Sample.	Date Collected.	Alkalinity.
1912	September 17, 1901.	32.
1913	October 2, 1901.	25.
1914	October 3, 1901.	29.
1915	October 4, 1901.	30.
1916	October 5, 1901.	32.
1917	October 7, 1901.	31.
2034	December 17, 1901.	4.
2035	December 18, 1901.	3.
2036	December 19, 1901.	3.
2037	December 20, 1901.	16.
2038	December 21, 1901.	17.
2039	December 22, 1901.	17.

The October samples represent a low period of the river while the December collections cover part of the period of and following a sharp rise in the river, as shown by river stage readings at the Pt. Pleasant and Huntington, W. Va., stations.

Gallipolis. See annual report for 1898, page 555. Water is obtained from a series of four cast iron filter wells sunk in a sand bar at the head of Gallipolis Island. Each well is four feet in diameter, six feet high, and open only at the bottom which is thirteen feet below low water mark. The sand shifts and thus varies in depth. The water thus obtained is shown to be largely if not entirely river water, but with the objectionable features removed and none added, as at Mingo Junction and Ripley. In the light of the analyses at hand, Gallipolis is obtaining the best water in any public supply in the state where the water is taken from the Ohio River. The city water is said to never become roily, and the extremely uniform condition of it is well shown in the analytical tables and also by the very flat curves of plate 25. (Exception apparently occurs in the bacterial curves since they are plotted to logarithms).

The minimum, maximum and average findings of the hydrant water at Gallipolis were:

	Minimum.	Maximum.	Average.
Oxygn required	.24	1.04	.59
N. as albuminoid ammonia	.008	.087	.034
N. as free ammonia	None.	.016	.006
Suspended material	None.	12.	Trace.
Bacteria per c.c.	23.	700.	249.

A comparison of these averages with the river water shows reductions as follows:

Oxygen required	91%
N. as albuminoid ammonia	88%
Suspended matter	99%
Bacteria	97%

This creditable showing is in no wise due to a good condition of the river before filtration, as the high points for Gallipolis on the solid curves of plates 1 to 12 show.

It might be thought the silt and clay would eventually clog the sand bar, but it seems with the natural washing from the stream and the occasional back flushing given by means of connection with the reservoir pressure, the sand is kept free. We understand that during the low water of one season trenches had to be dug in the sand to bring the water nearer the wells and thus keep up the required amount.

Ripley. See page 559, 1898 annual report of the Ohio State Board of Health. This supply is derived from two eight-inch drilled wells 102 feet deep and located at the water's edge when the stream is moderately low. The analyses show that the expectation on the part of some of the citizens to thus obtain a filtered river water has not been realized. A study of the curves on plate 26 with a consideration of the mineral characters of the two series of samples soon establishes the fact that the hydrant water at Ripley is not derived from the Ohio River, or else it has undergone some striking changes. This village should not be classed with the Ohio River supplies but with those obtaining their water from ground sources.

It is reported that the level of the water in the wells is always the same as in the river. We take this to mean the ground water level is controlled by back pressure from the river. If the demand on the wells should considerably exceed the supply of ground water, it is possible river water might be obtained.

In quality the Ripley water is considered potable. It is relatively free from organic matter, although giving some evidence of past pollution, is considerably higher in soap consuming properties than the river water but on the other hand, as is unusual in a well water, contains less material to produce boiler scale than does the river water.

SUMMARY OF PUBLIC WATER SUPPLIES FROM THE OHIO RIVER.

While the number of samples was necessarily more limited than is desirable, and may not cover all ranges of conditions, yet they represent varying conditions, and in view of the extensive studies at Pittsburgh and Cincinnati, afford some valuable and suggestive information as to the various treatments of Ohio River water, and these are now summed up in connection with a statement as to the character of the water in each supply.

1. NATURAL FILTRATION THROUGH SAND.

The plant at *Gallipolis* is doing very satisfactory work, and furnishing a clear and wholly acceptable water with the highest degree of purification attained by any of the processes under consideration. The weaknesses would be clogging of the sand bar or exposure of the filter wells by the sand being washed away, but these do not seem to have appeared.

Mingo Junction. This plant is in theory like the preceding one, but in practice is less efficient, gives some indication of faulty filtration, and the filter crib is so placed as to obtain more or less ground water influenced by the subsoil drainage of the village. The water is potable but rests under some danger from Steubenville's sewage and Mingo Junction's lack of sewerage. Deficient purification from either side would mean serious danger.

Ripley. This village would be classed here if it were obtaining river water, but it receives a supply of potable ground water.

2. MECHANICAL FILTRATION WITH PRELIMINARY SUBSIDENCE.

Pomeroy. The plant at this city working against a combination of difficulties has obtained fairly good results with the exception of the use of more coagulant at times than the alkalinity of the water was able to care for. With this defect remedied as it may be and doubtless has been now that the authorities are aware of the conditions, and with a slight improvement in the character of the effluent at times when a coagulant is not in use, the Pomeroy water would approach the excellent character of the Gallipolis water.

3. PLAIN SUBSIDENCE.

a. *Toronto, Steubenville,* and *New Richmond.*

New Richmond and Toronto gave about equal efficiencies, the former having the greater amount of vegetative organic matter and suspended material to cope with, the latter the greater sewage influence. At each village about three-fourths of the suspended solids and nearly one-half of the organic matters were removed while the numbers of bacteria were reduced 70 per cent and 58 per cent respectively. In the light of all available information it seems the quality of the hydrant waters at these two villages might be somewhat improved, (in view of the relatively low consumption and long storage) by close attention to the rises and condition of the river, and with pumping of the water from the river only at the more opportune times.

At Steubenville with its much larger consumption there is not the same leeway in choice of conditions, yet the results at this city are almost as good as at the two just discussed. This indicates the plant at Steubenville is being well operated. As a matter of fact, less suspended matter was obtained in the Steubenville hydrant water than at either of the other two places.

The results indicate that the city waters at these places would generally be classed as usable waters as far as safety to health is concerned, but they contain more or less suspended soil and organic matter, and, consequently, are not as clear and free from bacterial life as is desirable in public supplies.

The investigation indicates the subsided waters obtainable at Toronto, Steubenville, and New Richmond could be subsequently filtered by the English process, giving pure, safe and wholly acceptable soft waters for public and private use.

b. *East Liverpool* and *Marietta.*

A small amount of purification is obtained at these cities since about one-seventh of the organic matter disappears, judged by the oxygen required and the nitrogen as albuminoid ammonia. At the former place 15 per cent of the suspended solids and 70 per cent of the bacteria were removed, while the corresponding figures at Marietta were 40 per cent and 23 per cent.

As regards immediate effect on health these waters would have to be called usable for portions of the time, but their appearance, and the varying character of the suspended matters class them as undesirable and at times even suspicious.

In regard to possible treatment of the river water there is nothing in the present findings to indicate failure in handling the water at East Liverpool by slow sand filtration. With mechanical filtration and a coagulant the alkalinity would need closest attention with a probable artificial increase of the same part of the time. At Marietta this question is an open one for while either treatment might be available, further investigation might also show one to be decidedly preferable to the other.

4. UNTREATED WATERS.

Wellsville, Martins Ferry, Bellaire, Ironton, and *Portsmouth.* At the last two places the water besides containing some sewage influences, is muddy so often, so long, and so thoroughly as to make it entirely unfit for domestic use.

At *Wellsville* the water is roily frequently, and open to danger all the time from the neighboring sewage of East Liverpool, and is therefore neither a satisfactory nor a safe supply.

At *Bellaire* some mud is obtained, but the chief objection to the water is the variety of sewage sources, which as previously stated, make the use of this water a menace to health, although the analyses indicate some alleviating influences due perhaps to local tributaries, currents, etc.

While the results at *Martins Ferry* do not indicate muddy water as the Ohio goes, nor gross pollution from intestinal sources, yet there is enough evidence of organic and inorganic pollution to mark the water as unfit for domestic use without additional treatment.

The authorities at Wellsville and Ironton have made moves toward securing improved supplies. It is to be hoped the three remaining cities will follow suit. With reference to possible treatment of the river water at these places the results suggest the following statements. English filtration would in all probability be a failure at Ironton or Portsmouth, but would probably be feasible at Martins Ferry and Bellaire. It might be found practical at Wellsville, but additional studies are needed to conclusively determine this point.

With mechanical filtration, close attention would have to be given to the amount of coagulant used and the alkalinity of the water.

CONCLUSIONS.

1. The Ohio River does not continuously furnish at any place along the border of this state a water that is suitable in the untreated condition to be used for a public supply.

2. Clear, wholesome, and safe water is at present being obtained in Ohio from this river only by filtration.

3. The best results were obtained by natural filtration through a sand bar.

4. Good results may be obtained by use of a coagulant and mechanical filtration.

5. When a coagulant is employed, the low alkalinities which may appear demand intelligent regulation of the amount of coagulant, continued determinations of the alkalinity of the water, and the addition of an artificial alkalinity when necessary.

6. The alkalinity was quite low in the upper portion of the river, but was somewhat increased subsequently by the more alkaline waters of the larger tributaries from the north.

7. The investigations show most of the silt and clay so troublesome in purification processes is introduced into the Ohio River between Marietta and Cincinnati, much of it being derived from Muskingum River, Little Miami River, and especially the tributaries from the south.

8. The conditions as given show how improbable it is, in the light of the Cincinnati results, that English filters can successfully handle the water below the mouths of Muskingum and Little Kanawha rivers. On the other hand, it seems the conditions in general will be found in favor of English filtration at points above Marietta.

9. Plain subsidence as now in operation at Ohio cities and villages on the Ohio River fails to yield at all times a satisfactory water for public supplies.

II. LAKE ERIE.

INTRODUCTION.

The work of this preliminary investigation of the Ohio public water supplies derived from Lake Erie, was carried on in essentially the same manner and at the same time as the one for the Ohio River supplies, and the reader is referred to the opening pages of the preceding report for details.

On account of previous examinations made under the direction of the State Board of Health at Lakeside, Lorain, and Sandusky, samples of the water supplies of these places were not made a part of the regular work for 1901.

Since Cleveland is at present engaged in extending a new intake tunnel to a much greater distance from shore, a change will soon be made to the new location and it was deemed unnecessary to make examinations at the old localities so soon to be abandoned.

SAMPLES.

In the following list there are given the places from which samples were taken in the year 1901, the number of samples received from each city or village, and the name of the collector.

Place.	No. of Samples.	Collector.
Ashtabula	11	Mr. J. W. Robinson.
Conneaut	8	Dr. D. S. Cossitt or Mr. J. J. Helmer.
Painesville	10	Dr. E. D. Whitney.
Port Clinton	8	Dr. Paul de la Barre.

Our thanks are due the above gentlemen for the kindly assistance they have rendered in the work.

The findings from these thirty-seven samples, together with the analyses previously and subsequently obtained, furnish us with considerable valuable information.

RESULTS OF ANALYSES.

The analytical results of the various examinations are given in the following tables, while some of the more important findings are also submitted graphically. We have included for comparison in the table and the plates the results of an examination of a sample of the Painesville hydrant water collected March 10, 1902. In the plates the unbroken line signifies Lake Erie water at or near the intake, while the hydrant water is represented by the dotted curve. Horizontal divisions indicate time between samples but no definite scale is employed. The scale for vertical divisions is found on the plate. The difference between the two curves indicates in a general way the purification attained by the local process of treating the water, while the course of a curve represents the fluctuation in the character of the water.

RECORD OF CHEMICAL AND BACTERIOLOGICAL EXAMINA-

(Parts per

Sample Number.	Locality of Sample.	Date Collected.	Color.	Turbidity.	Sediment.	Odor.
1657	Ashtabula, high pressure	April 25, 1901	22	37	s	none
1707	" "	June 19, 1901	12	t	v. s.	faint
1755	" "	July 10, 1901	20	t	t	faint
1801	" "	Aug. 6, 1901	9	v. s.	v. s.	faint veg.
1658	Ashtabula, low pressure	April 25, 1901	18	21	t	none
1706	" "	June. 19, 1901	10	s	v. s.	faint
1754	" "	July 10, 1901	20	s	v. s.	veg.
1800	" "	Aug. 6, 1901	9	t	t	none
1859	" "	Aug. 31, 1901	8	t	t	none
1899	" "	Oct. 2, 1901	12	v. s.	v. s.	none
1944	" "	Oct. 29, 1901	12	v. s.	v. s.	none
	AVERAGE	....	14	....	......	....
1661	Conneaut, Lake Erie...	April 26, 1901	10	t	t	none
1709	" " ...	June 19, 1901	10	t	t	none
1756	" " ...	July 10, 1901	8	t	v. s.	none
1832	" " ...	Aug. 13, 1901	5	t	t	veg.
	AVERAGE	....	8	t	......	....
1662	Conneaut, hydrant	April 26, 1901	10	trace	t	none
1708	" "	June 19, 1901	...	... .	.....	....
1757	" "	July 10, 1901	5	trace	none	none
1833	" "	Aug. 13, 1901	T	none	none	none
	AVERAGE	....	5	....	.....	....
1663	Painesville, Lake Erie..	April 25, 1901	23	111	c	none
1722	" " ..	June 24, 1901	23	58	s	trace
1763	" " ..	July 10, 1901	22	178	s	peculiar
1810	" " ..	Aug. 7, 1901	18	78	s	none
1938	" " ..	Oct. 24, 1901	12	136	s	none
	AVERAGE	....	20	112	... ..	....
1664	Painesville, hydrant ...	April 25, 1901	16	t	t	none
1723	" " ...	June 24, 1901	8	none	none	none
1764	" " ...	July 10, 1901	5	none	none	none
1811	" " ...	Aug. 7, 1901	8	t	t	none
1939	" " ...	Oct. 24, 1901	8	none	none	none
	AVERAGE	....	9	....	......	....

TIONS OF PUBLIC WATER SUPPLIES FROM LAKE ERIE.

Million.)

Oxygen Required.	Nitrogen as				Chlorine.	Alkalinity.	Incrusting Constituents.	Total Solids.	Loss on Ignition.	Suspended Solids.	Bacteria per c.c.	Colon Present.
	Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.								
2.27	.094	.015	.001	.00	4.3	81	12	192	62	47	650	—
1.57	.121	.014	.000	T	4.9	91	......	170	68	21	100	—
1.32	.087	.009	.000	T	6.7	86	......	239	129	103	160	—
2.18	.190	.032	.006	.05	5.3	94	......	163	23	u	600	+
1.99	.102	.020	.002	.00	4.3	78	none	140	47	7	900	—
2.75	.160	.018	.000	T	4.3	91	......	175	63	27	110	—
1.40	.144	.020	.001	T	6.3	86	......	189	78	41	250	—
1.46	.146	.018	.000	.05	5.5	93	......	152	35	t	90	—
1.94	.134	.008	T	T	5.2	93	......	129	....	t	225	—
1.88	.106	.002	.000	.00	4.3	97	......	155	....	u	160	—
1.33	.109	.008	.000	.07	5.4	91	......	139	....	u	350	—
1.83	.127	.015	.001	.02	5.1	89	......	168	63	31	325	..
1.51	.100	.021	T	.00	4.2	72	none	150	67	12	650	+
1.39	.114	.019	.000	.20	4.9	85	u	161	63	35	65	—
1.82	.111	.013	.002	T	5.1	87	12	176	73	44	200	—
2.21	.176	.008	.000	.10	4.8	96	22	160	70	u	190	—
1.73	.125	.015	.001	.08	4.8	85	......	162	68	30	275	..
.92	.054	.024	.000	.00	4.8	66	30	163	31	4	135	—
.....	......	......	.000	.12	......	......	......	......	....	......	160	—
.88	.087	.003	.000	T	6.0	88	28	175	86	16	80	—
1.46	.093	.002	.000	.08	4.7	89	14	158	90	u	18	—
1.09	.078	.010	.000	.05	5.2	81	24	165	69	10	100	..
6.77	.205	.019	T	.00	3.0	67	none	298	52	150	7000	+
3.71	.318	.058	.007	T	7.5	89	u	215	91	74	4900	+
2.72	.154	.016	T	T	7.0	81	u	241	51	76	850	—
2.34	.124	.002	T	.12	5.5	92	u	182	37	u	23000	—
3.07	.158	.023	T	.12	5.6	91	u	248	u	115	2000	+
3.72	.192	.024	.002	.05	5.7	84	......	237	58	104	7500	..
1.75	.076	.021	T	.00	6.5	72	32	248	68	6	120	—
.73	.066	.004	.000	T	7.5	103	......	223	94	7	550	—
.94	.082	.006	.000	T	7.8	97	......	167	45	u	22	—
.72	.042	.005	.000	.08	5.7	98	......	181	58	u	950	—
.87	.070	.007	.000	.08	5.4	96	......	158	u	u	lost	—
1.00	.067	.009	......	.03	6.6	93	......	195	66	......	400	..

RECORD OF CHEMICAL AND BACTERIOLOGICAL EXAMINATIONS

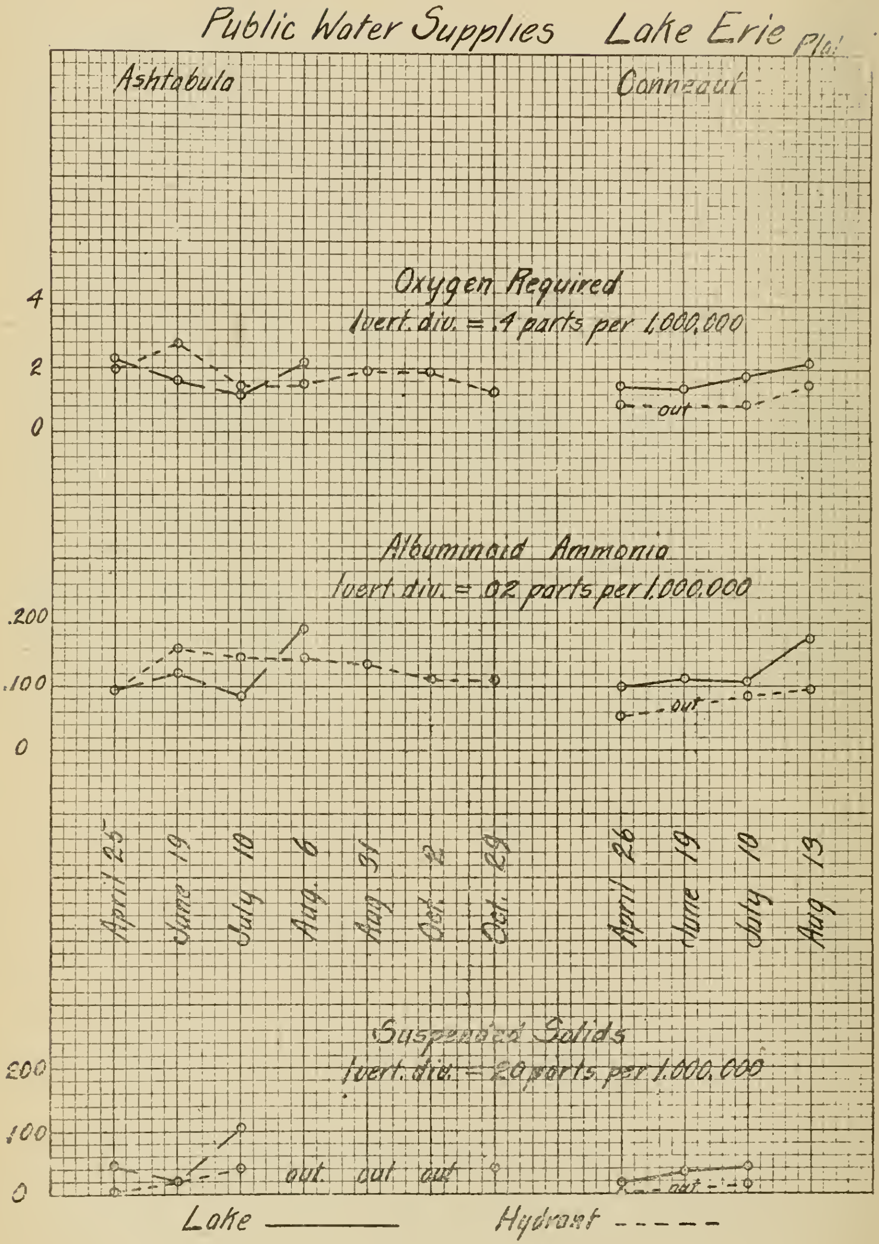
(Parts per

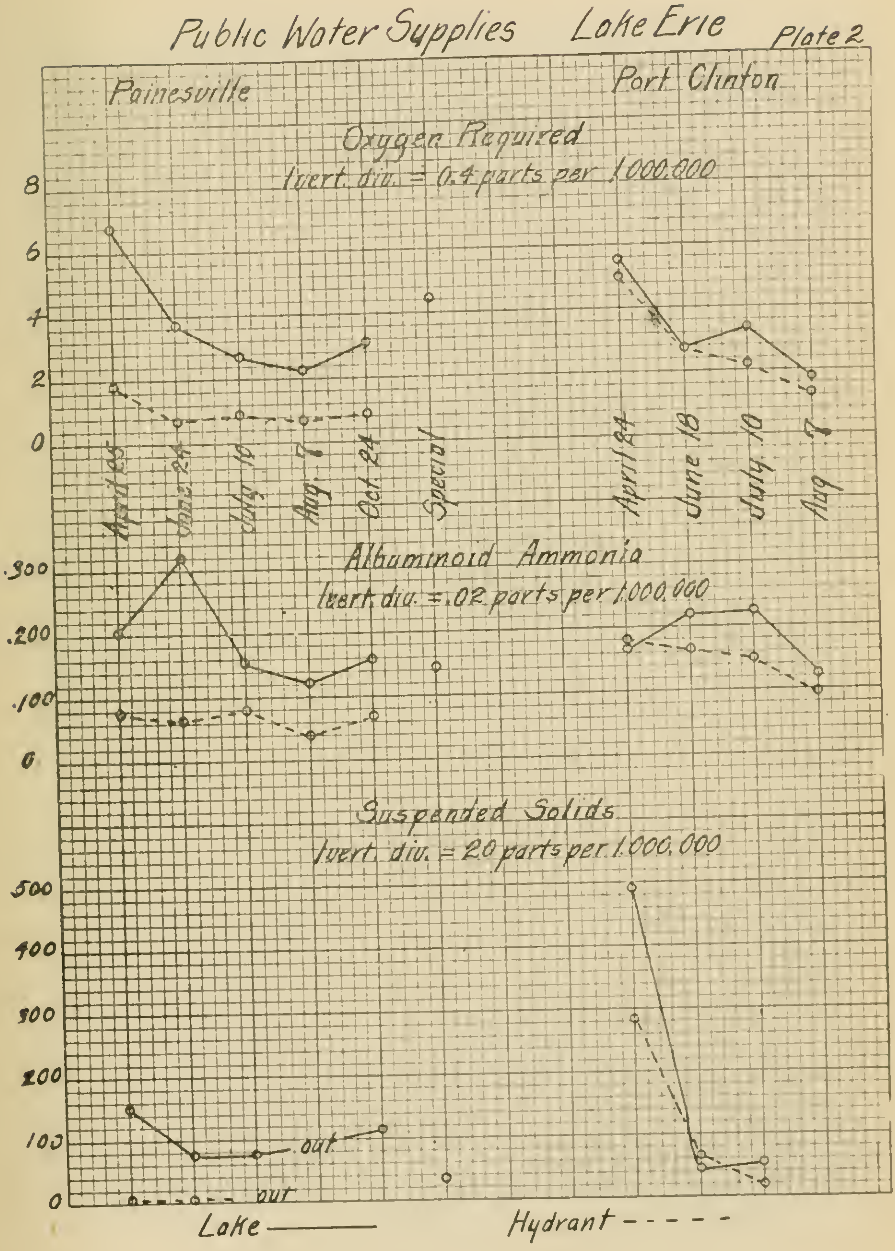
Sample Number.	Locality of Sample.	Date Collected.	Color.	Turbidity.	Sediment.	Odor.
2119	Painesville, hydrant — special	Mar. 10, 1902	35	58	v. s.	veg.
1656	Port Clinton, Lake Erie at intake	April 24, 1901	20	923	s	none
1704	"	June 18, 1901	15	78	s	fishy
1758	"	July 10, 1901	25	92	s	peculiar
1808	"	Aug. 7, 1901	23	v. s.	s	faint
	AVERAGE	....	21	364	......	.. ..
1655	Port Clinton, hydrant..	April 24, 1901	25	666	c	none
1705	" " ..	June 18, 1901	15	116	s	faint & fishy
1759	" " ..	July 10, 1901	27	83	s	peculiar
1809	" " ..	Aug. 7, 1901	21	t	t	faint
	AVERAGE	....	22	288	......	....

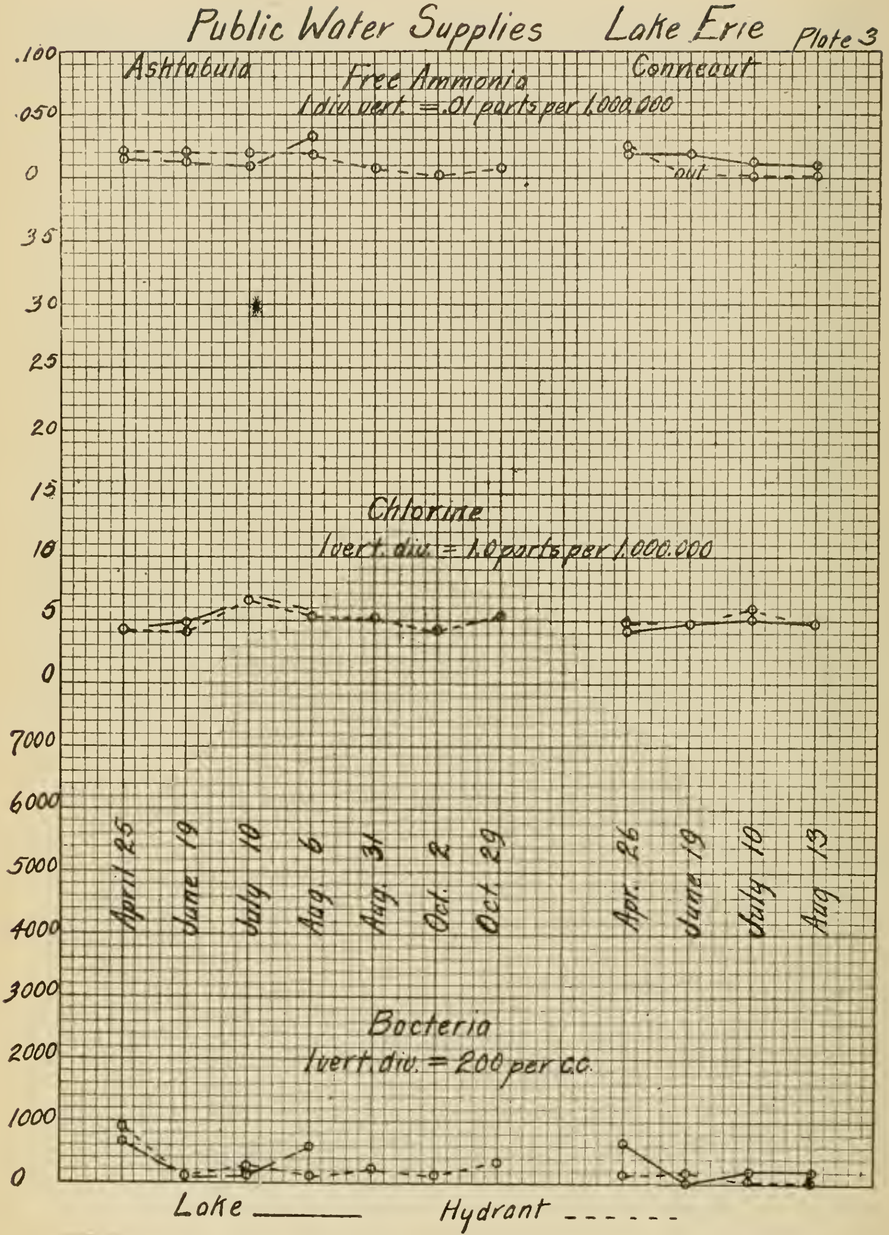
OF PUBLIC WATER SUPPLIES FROM LAKE ERIE — Concluded.

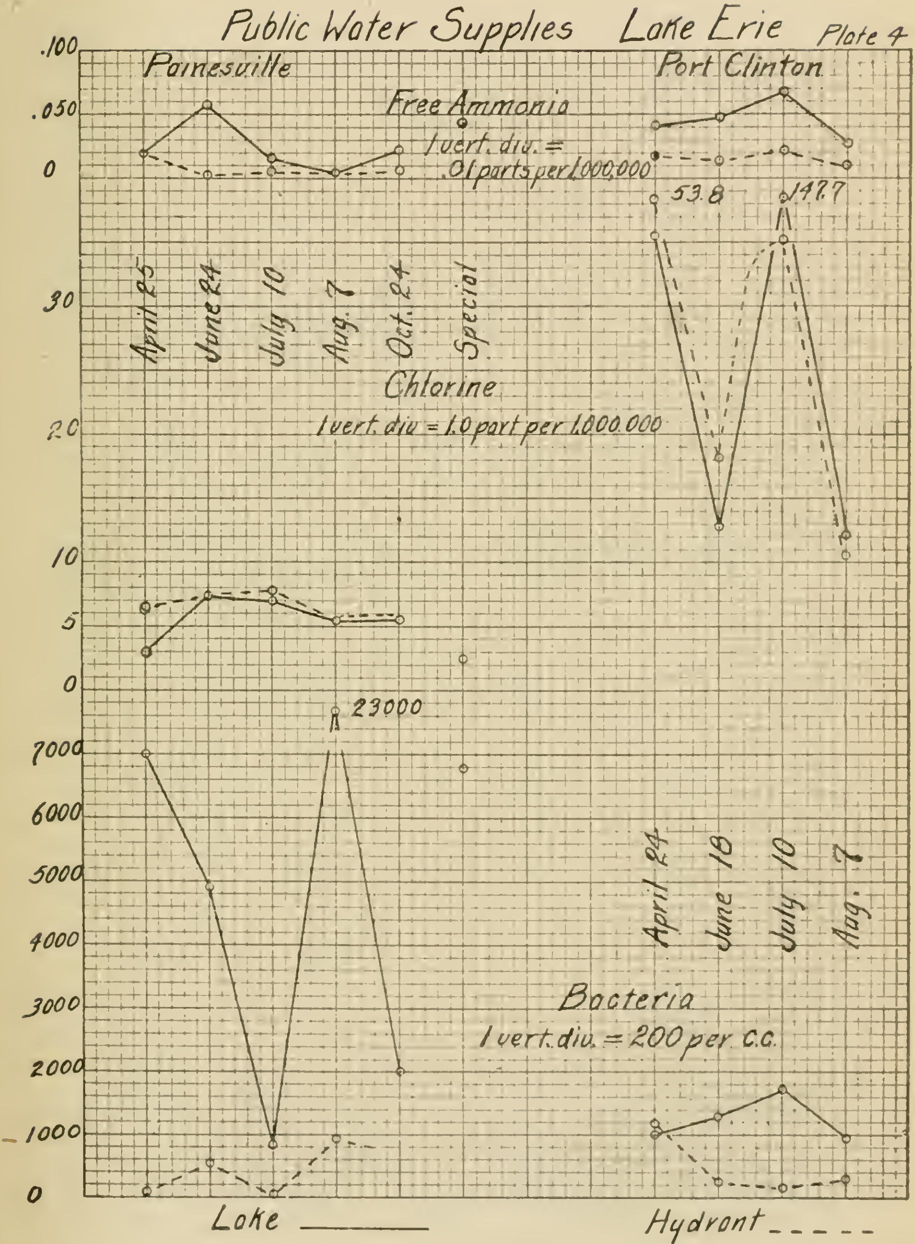
Million.)

Oxygen Required.	Nitrogen as				Chlorine.	Alkalinity.	Incrusting Constituents.	Total Solids.	Loss on Ignition.	Suspended Solids.	Bacteria per c.c.	Colon Present.
	Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.								
4.51	.144	.044	.000	.68	2.5	51	26	161	u	36	6800	+
5.48	.164	.041	.004	1.58	35.6	106	35	745	132	489	1000	—
2.73	.222	.048	.004	.15	12.9	88	none	220	75	43	1300	—
3.40	.226	.068	.030	.19	147.7	98	u	553	228	55	1700	—
1.78	.126	.028	T	T	12.1	86	u	154	36	u	950	—
3.35	.184	.046	.010	.48	52.1	94	......	418	118	147	1200	..
4.97	.182	0.18	T	1.39	53.8	101	76	608	137	286	1200	—
2.72	.166	.015	T	.10	18.1	88	16	234	77	64	250	—
2.21	.152	.022	.000	T	35.4	96	u	263	76	21	150	—
1.33	.097	.010	T	T	10.5	85	u	159	34	T	275	—
2.81	.149	.016	......	.37	29.5	92	......	316	81	93	450	..


Public Water Supplies Lake Erie
Pl.
Ashtabula
Conneaut
Oxygen Required
1 vert. div. = .4 parts per 1,000,000
4
2
0
out
Albuminoid Ammonia
1 vert. div. = .02 parts per 1,000,000
.200
.100
0
out
April 25
June 19
July 10
Aug. 6
Aug 31
Oct. 2
Oct. 29
April 26
June 19
July 10
Aug 19
Suspended Solids
1 vert. div. = 20 parts per 1,000,000
200
100
0
out.
out
out
out
Lake ————
Hydrant - - - - -


Public Water Supplies Lake Erie
Plate 2
Painesville
Port Clinton
Oxygen Required
1 vert. div. = 0.4 parts per 1,000,000
8
6
4
2
0
April 25
June 24
July 16
Aug. 7
Oct. 24
Special
April 24
June 18
July 10
Aug. 7
Albuminoid Ammonia
1 vert. div. = .02 parts per 1,000,000
.300
.200
.100
0
Suspended Solids
1 vert. div. = 20 parts per 1,000,000
500
400
300
200
100
0
out
out
Lake ———
Hydrant - - - - -


Public Water Supplies Lake Erie
Plate 3
Ashtabula
Free Ammonia
1 div. vert. = .01 parts per 1,000,000
Conneaut
out
.100
.050
0
35
30
25
20
15
10
5
0
Chlorine
1 vert. div. = 1.0 parts per 1,000,000
7000
6000
5000
4000
3000
2000
1000
0
April 25
June 19
July 10
Aug. 6
Aug. 31
Oct. 2
Oct. 29
Apr. 26
June 19
July 10
Aug. 13
Bacteria
1 vert. div. = 200 per c.c.
Lake ______
Hydrant ------


Public Water Supplies Lake Erie
Plate 4
Painesville
Port Clinton
Free Ammonia
1 vert. div. =
.01 parts per 1,000,000
.100
.050
0
53.8
147.7
April 25
June 24
July 10
Aug. 7
Oct. 24
Special
30
Chlorine
1 vert. div = 1.0 part per 1,000,000
20
10
5
0
23000
7000
6000
5000
4000
3000
2000
1000
0
April 24
June 18
July 10
Aug. 7
Bacteria
1 vert. div. = 200 per C.C.
Lake ————
Hydrant - - - - -

DISCUSSION OF RESULTS.

Since a full description of each water supply, and its location as regards the local sewage have been given by the Engineer of the State Board of Health in the annual report for 1898, and reviewed in the present volume, only brief mention will be made of the arrangement of the water supply at any place, and the reader is referred to the report named for further details.

CHARACTER OF LAKE ERIE WATER.

In the light of information at hand, it may be said at present, Lake Erie furnishes a usable water for domestic purposes so long as that water is not subjected to local pollution. In considering this water then for a public supply the question becomes one of the character and extent of the local pollution together with the degree of purification subsequently attained.

Ashtabula. By referring to the 1898 report, page 546, the reader will find the system at Ashtabula includes a standpipe and a reservoir, pumped to alternately from a submerged intake crib half a mile from shore. The reservoir supplies the low pressure service, while the standpipe with its capacity of 225,000 gallons feeds the high pressure service. No filtration occurs at the crib, and, when pumping occurs on either service, water may be derived by the consumer directly from the lake without the intervention of either reservoir or standpipe. No lake samples were taken except by taking advantage of the conditions just named and keeping a close record of the service to which water was being pumped at the time of sampling. A comparative study of the results with this fact in mind showed the variation in the lake water was greater than any purification obtained in the system. In other words, some of the lowest as well as some of the highest findings were in samples so obtained as to be pumped direct from the lake. The purification derived is very small and the hydrant water may be taken as closely representing the lake water at the intake. The curve for the high pressure service is indicated on the plates by long dashes while the low service is shown by the ordinary dotted curve used for hydrant water.

On plates 1 to 4 a comparison of the Ashtabula curves with the unbroken line curves of the other cities shows a relatively good condition at the Ashtabula intake as regards absence of sewage. It would seem, however, from the location of the intake in connection with the location of the point where the river empties its contents, bearing the sewage of the city, that more serious pollution must at times occur with adverse currents. It is fortunate for the people of Ashtabula that the pollution reaching the intake is not greater since there is so nearly an absence of purification in their present system.

The results shown in the tables would class the water at this city as generally usable, but it is not Lake Erie water entirely free from pollution. Colon bacilli were found in but one of the eleven samples. The minimum, maximum and average for the more important findings were as follows:

	Minimum.	Maximum.	Average.
Oxygen required	1.32	2.75	1.83
N. as albuminoid ammonia	.087	.190	.127
N. as free ammonia	.002	.032	.015
Chlorine	4.3	6.7	5.1
Suspended solids	None.	103.	41.
Bacteria per c.c.	90.	900.	325.

Cleveland. As previously stated, no samples were taken at this city because the location of the intake was soon to be changed. The old supply is described on page 547 of the 1898 report and is more or less polluted, as is well known.

Conneaut. The old supply for this city is described on page 550 ot the annual report of the Ohio State Board of Health for 1898, but the new supply adopted in 1899 is described on page 92 of the 1899 report. Under the present arrangement lake water is used after treatment by Jewell mechanical filters, using alum as a coagulant. In addition to the analyses of the present investigation, examinations of samples of water from Conneaut have been made in 1899 and the early part of 1902.

By reference to the curves (plates 1 and 3) we find very little indication in the present samples of serious pollution of the lake at the intake and this appears to hold true for a considerable portion of the time. All the data at hand points to this conclusion, — the lake water at the intake generally shows very little if any pollution from sewage. There are times however when such a pollution does occur and this has been clearly demonstrated at the cost of human life.

Prior to the installation in 1899 of mechanical filters, this city had used lake water filtered through the beach, but an increasing consumption necessitated the introduction at times in 1899 of unfiltered lake water by means of an emergency intake. As a result there occurred an epidemic of typhoid fever with ninety-four cases and twelve deaths reported. Some 90 per cent of the cases used hydrant water. (See Report of an Investigation of Typhoid Fever at Conneaut, page 78, annual report of Ohio State Board of Health for 1899.) Mechanical filtration was then established and the trouble ceased.

When the writer visited Conneaut on April 26, 1901, to begin the present investigation, typhoid fever was found to be prevailing in the city, some twenty-five cases and two deaths having occurred since the beginning of the month. An investigation was at once begun and prosecuted as far as the time of the writer was available, with the result that it was learned the waterworks plant had been out of alum for a few days in March (certainly on the 18th, 19th and 20th), and no coagulant was in use during that period. As the first cases appeared at the beginning of April the interval of time corresponds with the accepted incubation period of typhoid fever, hence the inference that this run of typhoid fever was due to sewage pollution from the city reaching the intake while the water was not receiving a proper purification. In order that the outbreak might be fully investigated and reported, the local authorities were requested to collect and forward to the State Board of Health the usual data (including sources of water and milk used by the patients, their ages, occupations, etc.), but the request was not complied with. In the light of later developments it is certainly a matter of deep regret that the above information was not collected and forwarded for the report would have called attento the dangers entailed by defective filtration of a water liable to serious pollution.

In less than a year from the date given above, another and more serious outbreak of typhoid fever occurred in Conneaut. At the present writing (April, 1902,) an epidemic with sixty-four reported cases has just been investigated by the Engineer of the State Board of Health and shown to have resulted from an insufficient purification of the city water due apparently to the use of too small an amount of coagulant.

These three sad experiences, painful indeed to many Conneaut families, stand as striking object lessons of the fact that the lake water at the Conneaut intake is occasionally polluted to a dangerous degree, and therefore *the only safe course is to treat the water at all times in such a way that the pollution will be overcome.* There can be no question but that mechanical filtration (the system now in use) can accomplish this purification with due consideration paid to the operation of the plant. With proper manipulation and a correct use of coagulant, the filtered water at Conneaut will afford one of the best public supplies in the state, and one that will be clear, soft, palatable, and safe. The alkalinity of the intake water is sufficiently high to prevent the appearance of any undecomposed coagulant in the effluent unless there be a needless and wasteful amount of the coagulant used. In view of the cost of alum the waterworks company may be depended upon to see that such an uncalled for wasteage does not occur. The following results were obtained of samples of the city water in 1901:

	Minimum.	Maximum.	Average.
Oxygen required	.88	1.46	1.09
N. as albuminoid ammonia	.054	.093	.078
N. as free ammonia	.002	.024	.010
Chlorine	4.7	6.0	5.2
Bacteria per c.c.	18.	160.	100.

The averages gave reductions from the intake water as follows: Oxygen required, 37 per cent; N. as albuminoid ammonia, 38 per cent; suspended matter, 67 per cent; bacteria, 64 per cent. That these removals were not greater is due to two factors, viz: the low findings in the lake water, and the economy sought in keeping the amount of coagulant as low as possible and yet yielding a *clear* effluent. In a water as clear as the intake water at Conneaut, clearness of the effluent should not be the criterion by which the amount of coagulant is determined, for, under the condition given, the effluent might be of satisfactory appearance and yet be far from satisfactory as regards bacterial character — and therein lies the danger.

Lakeside. The water is pumped from the lake and then passed by gravity through sand filters without the use of a coagulant. See 1898 report, pages 112-114. On account of previous work at this village, no samples were taken in 1901, but, as this is the only place in the state where Lake Erie water is being treated by English filtration (as distinguished from the natural filtration through the beach sand at Painesville), we would call attention to the reports of the examinations made at Lakeside. See 1898 report, pages 105-112; also report for 1899, pages 221-225, 259 and 260. It is seen it was possible to obtain good results, although the filters were being operated much of the time in a defective manner, and, in consequence, the bacterial efficiencies were not what they should have been. With the bacteria removed reaching 95 per cent under the adverse circumstances of a very low bacterial content of the raw water to begin with, coupled with an unwise and careless operation of the system, it can be said filtration of the lake water by the English process is feasible.

Lorain. For a description of the supply see page 552 of the 1898 report. A special investigation was conducted at this city in 1897 by Messrs. Hazen, Hollis and Flynn, and the results obtained show the satisfactory manner in which the lake water may be purified by mechanical filtration, using alum as a coagulant. See report on the Mechanical Filtration of the Public Water Supply of Lorain, pages 154-163, 1897 report.

The freedom of Lorain from typhoid fever since the installation of filters, compared with its previous severe affliction, is a practical and effective endorsement of the ability of this process to yield a safe and potable public supply. See paper by Dr. Cox, health officer at Lorain, page 762, 1899 report.

During the year 1901 a change in the coagulant employed was made at Lorain. An iron solution is now employed, and we are informed it is cheaper than alum and now doing satisfactory work, but the latter was not the case when its use at Lorain was first attempted.

Painesville. [See page 557, report for 1898.] The water is derived from galleries or filter boxes in the sand on the lake shore, whence it is pumped to a small standpipe. The process of purification is, therefore, natural sand filtration using the sand of the beach. It is said the later filter boxes are not surrounded with gravel, coal and charcoal as were earlier ones.

By comparison (findings in tables or plates) it is seen the intake water at Painesville shows a greater organic pollution than at Ashtabula, Conneaut, or Port Clinton. On the other hand, among the hydrant waters, Painesville made perhaps a trifle the best showing. Naturally, we have then the highest percentages of removal at the place last named. Practically all of the suspended matter was removed while the removals for oxygen required, albuminoid ammonia, and bacteria were 73 per cent, 65 percent, and 95 per cent respectively. The character of the hydrant water is indicated by the following minimum, maximum and average findings obtained in the present study:

	Minimum.	Maximum.	Average.
Oxygen required	.73	1.75	1.00
N. as albuminoid ammonia	.042	.082	.067
N. as free ammonia	.004	.021	.009
Chlorine	5.4	7.8	6.6
Solids	158.	248.	195.
Suspended matter	0.	7.	Trace.
Bacteria per c.c.	22.	950.	400.

It seems the good quality of the city water is not departed from often, and then only because the filter boxes are exposed by the sand washing away, or because water is drawn direct from the lake through the emergency intake. It is claimed the former condition seldom if ever occurs since the beach is building at the location of the filter boxes and thus necessitates the introduction of new boxes and the abandonment of old ones — one of the defects of the system. Another and more serious defect is the employment at times of the emergency intake, whereby the health of the community is endangered.

A sample of the Painesville hydrant water has recently been received from Mr. H. J. Valleau, health officer of Richmond Village (a suburb of Painesville), and for comparison the analytical findings are included as a special sample in the table and they are also indicated on the plates but not connected with the hydrant samples of the regular investigation. This sample corresponds to the untreated lake water, which doubtless it was, as we are informed ice in the harbor interfered with the filtration at the beach and water was necessarily taken through the emergency intake. The use of untreated water through this emergency intake or otherwise, in view of the pollution shown, can only be considered as a serious menace to the health of the community, and steps should be taken at once to prevent its recurrence.

Port Clinton. [See page 554, State Board of Health Report for 1898.] Water is pumped directly from the crib to the mains. The crib consists of two timber shells, the outer 30 feet square, the inner 12 feet square, with the intervening space filled with gravel. This crib is 1600 feet from shore but close enough to the harbor to receive pollutions, as shown by the analyses. The purifying influence of the crib and the little sedimentation in pipes is very small as shown by the following reductions from the intake determinations: Oxygen required, 16 per cent; albuminoid ammonia, 19 per cent; suspended matter, 37 per cent; bacteria, 62 per cent.

In the few samples obtained from the Port Clinton intake there was not much indication of sewage pollution, although this can hardly be avoided at all times with changing currents, and the mouth of the river only one-fifth of a mile away with its waters carrying sewage. By contrast with the samples from other sources we find two striking features at Port Clinton, viz: the greater amounts of suspended solids, and the high chlorides. The former disturbance arises from the local conditions and disturbances of the harbor, while the latter appears to be due to the salt used in the fishing industry — one of the principal interests of the village. The salt, and perhaps other wastes from the fishing houses and boats, ought not to be thrown into the harbor and thus affect the public supply.

The analyses of the hydrant water indicate some undesirable features as seen by the fluctuations of the curves, plates 2 and 4, and by the following figures:

	Minimum.	Maximum.	Average.
Oxygen required	1.33	4.97	2.81
N. as albuminoid ammonia	.097	.182	.149
N. as free ammonia	.010	.022	.016
N. as nitrates	Trace.	1.39	.37
Chlorine	10.5	53.8	29.5
Suspended solids	Trace.	286.	124.
Bacteria per c.c.	150.	1,200.	450.

Sandusky. The Sandusky situation was reported upon in the annual report of the Ohio State Board of Health for 1898 to which the reader is referred. We may say in recapitulation that no purification of the water is attempted beyond what sedimentation occurs in the standpipe. The water in the bay whence the supply is derived is polluted not only by the bad water of Sandusky River, but what is worse, by the sewage of the city of Sandusky itself. The following figures taken from the 1898 investigation give some idea of the conditions:

	Minimum.	Maximum.	Average.
Oxygen required................	2.02	3.93	2.74
N. as albuminoid ammonia.......	.120	.324	.179
N. as free ammonia	.016	.044	.030
Chlorine	4.7	13.6	9.8
Bacteria per c.c...................	115.	1,700.	600.

SUMMARY.

Among the eight villages and cities in Ohio deriving their public supplies from Lake Erie, three (Ashtabula, Port Clinton and Sandusky) may be considered as practically using an untreated water. At Ashtabula there seems to be in general but little pollution at the intake, still it is only a question of time or direction of currents until serious pollution will take place if raw water from the present intake continues to be used and the city sewage emptied into the river. The same is true of Port Clinton with the addition of greater amounts of suspended matter and waste material from the fisheries. At Sandusky the question is already a serious one and the city has indeed been fortunate to escape the severe lesson taught by that disciplinary teacher, experience — the lesson already learned at Conneaut and Lorain. Sandusky ought to profit by the record of events at her sister cities on the lake, and instead of talking about a new supply, proceed at once to secure a safe one.

Cleveland realized her danger and has been working for a new intake located four miles out. Such a location should be and probably will be reasonably free from serious pollution, but whether it will continue so at all times, with the sewage of so large a city added in the neighborhood, remains to be seen.

The remaining four supplies are filtered, two (Conneaut and Lorain) by the mechanical process, and two (Lakeside and Painesville) by plain sand filtration. At Conneaut and Lorain, the means are at hand and it is perfectly practicable to obtain clear, good and thoroughly safe waters. It is highly important, then, that the situation be understood and at neither place should the health of the citizens be endangered by carelessness, negligence, or ignorance in the manner of operating the filters, nor by the enforcement of too great economy in the question of coagulant.

At Lakeside a good water was obtained part of the time and may be obtained all the time by proper operation of the English filters there installed, increasing the number of filters when necessary to keep pace with the consumption.

A good water was obtained at Painesville by natural filtration through the sand of the beach, but as the beach is building, it necessitates an outlay at intervals for new filter boxes or galleries. In addition, the filtration is interfered with at times by ice, and water must then be taken directly from the lake at a point where the pollution is strongly in evidence. This is a serious defect and offsets the otherwise good results of the system.

CONCLUSIONS.

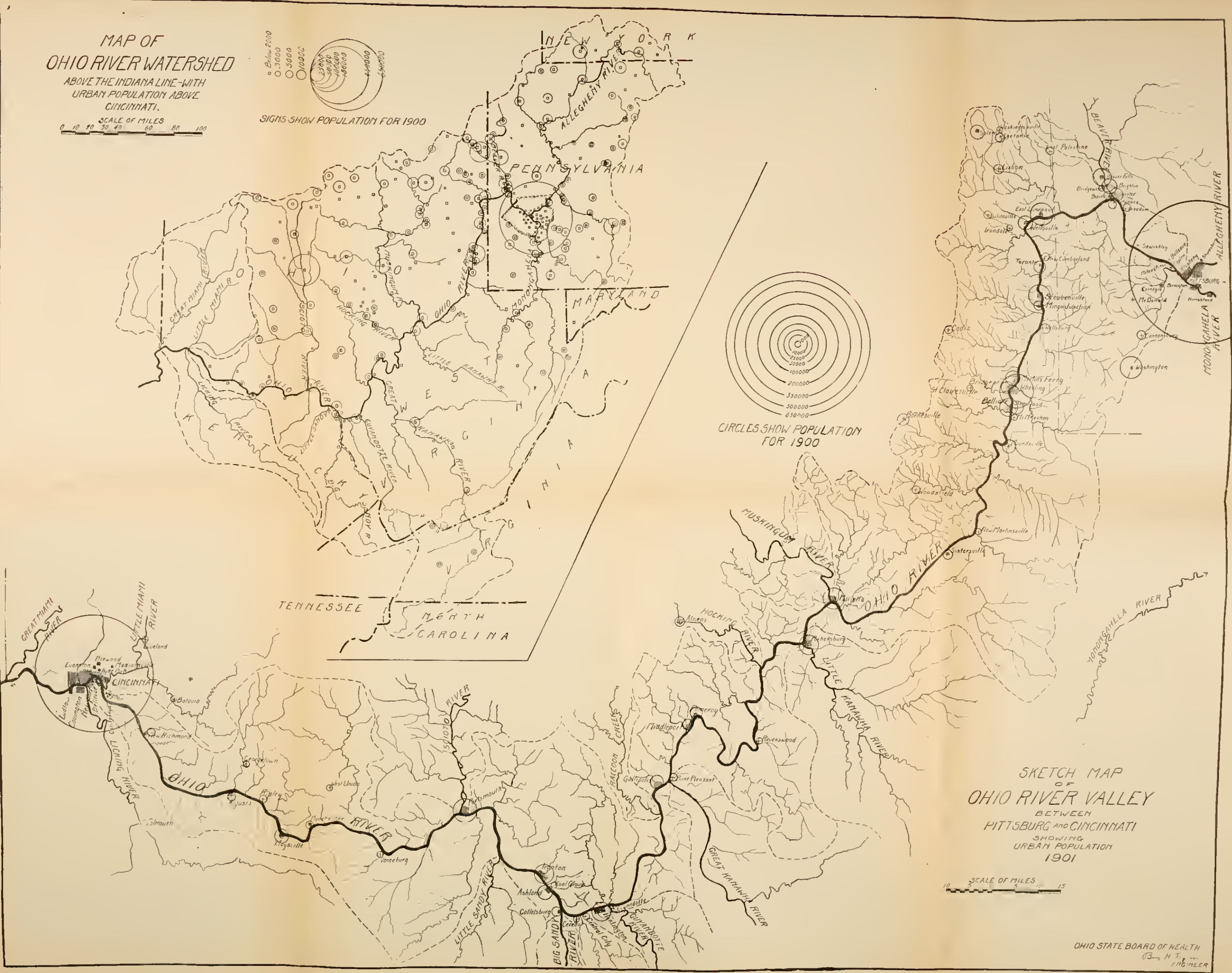
1. At no Ohio village or city, deriving its water supply from Lake Erie, can it be said that the water at the intake is free at all times from local pollution.

2. If the present intakes are maintained and local pollution not checked, some reliable process of purification should be employed for each public supply.

3. The investigations show the water of Lake Erie can be successfully treated by a proper operation of either the American or English system of filtration.

4. The process of natural filtration through the sand on the beach gave good results when in operation, but was a failure (at Painesville) under certain adverse ice conditions, necessitating the introduction of untreated water through an emergency intake.

5. The necessity of that careful and intelligent oversight of a purification plant, conceded by all as a requisite and yet so frequently neglected in practice, is plainly demonstrated in these investigations of the public water supplies of the Ohio River and Lake Erie.



MAP OF
OHIO RIVER WATERSHED
ABOVE THE INDIANA LINE—WITH
URBAN POPULATION ABOVE
CINCINNATI.

SIGNS SHOW POPULATION FOR 1900

CIRCLES SHOW POPULATION
FOR 1900

SKETCH MAP
OF
OHIO RIVER VALLEY
BETWEEN
PITTSBURG AND CINCINNATI
SHOWING
URBAN POPULATION
1901

OHIO STATE BOARD OF HEALTH
ENGINEER

RESUMÉ OF THE SOURCES OF POLLUTION AFFECTING THE PUBLIC WATER SUPPLIES OBTAINED FROM LAKE ERIE AND THE OHIO RIVER.

By Benj. H. Flynn, Engineer.

LAKE ERIE.

In the work for 1901 on the public water supplies from Lake Erie, the investigations were confined to Conneaut, Ashtabula, Painesville and Port Clinton. Cleveland, Lorain and Sandusky are also supplied with lake water; as the former is now at work on a new supply to be obtained from a new intake further removed from sewage pollution, and the public water supplies for Lorain and Sandusky have already been investigated, these three cities were not included in this year's work.

The information contained in the following summary has been taken from the annual reports of the Board, supplemented with such special reports as have been made, and it is supplied here in this form so as to be easily accessible for reference in the study of the supplies under consideration.

Conneaut. Population 1900, 7133; estimated population for 1901, 7522.

The public water supply for this city is obtained from Lake Erie at a point 1500 feet west of the mouth of Conneaut River, and 570 feet from the mean water line, in 14 feet of water. The water is first filtered through two Jewell mechanical filters before it is pumped to the mains and standpipe for distribution. Sulphate of aluminum is used as the coagulant, the amount being varied to suit the condition of the water, but with one-fourth grain per gallon as the average amount used.

The purification of the water must be maintained at a high standard as the lake water is subject to pollution from the sewage-laden waters of Conneaut River, and from the surface washings from the filthy streets and yards just back from the lake.

The public supply is in very general use by a large majority of the people, and its use will increase as soon as the efficiency of the methods of filtration is established.

Conneaut has an excellent system of sanitary sewers in the old portion of the city, and is now extending same to the newer, or harbor portion. These sewers at present discharge the sewage direct into Conneaut River, where the growing amount is commencing to cause a serious nuisance. It is estimated that about one-fourth of the people make use of the sewers, and this number is constantly being increased.

Ashtabula. Population 1900, 12,949: estimated population 1901, 13,410.

This city is supplied with water taken from Lake Erie at a point 3500 feet west of the mouth of Ashtabula River, and 2600 feet from the shore line where there is a depth of water of 26 feet.

The water is pumped direct through the mains to a reservoir and standpipe, the latter for the high service district. The combined storage capacity is nearly two and one-half million gallons, or a little over one and one-half days' supply. The water is well distributed over the city and is in use by about one-half of the total population. As the supply is pumped direct from the lake without purification of any kind it must suffer at times serious contamination from the sewage polluted waters of the Ashtabula River and from the wash from the harbor portion of the city.

The older section of the city has a quite extensive system of combined and sanitary sewers all leading direct to Ashtabula River. About 50 percent of the people have access to the sewers but it is not believed that more than one-fourth of these make use of them. Owing to the large volume of water in the lower portion of the river the sewage does not cause a serious local nuisance as yet, but any material increase in the amount will no doubt overload the stream.

Painesville. Population 1900, 5024: estimated population 1901, 5051.

Associated with this village, and corresponding to the harbor sections of the other lake towns, are the villages of Fairport and Richmond, with a combined estimated population for 1901, of 2500.

These three villages are supplied with water from filter galleries located on the shore of Lake Erie at a point one-half mile west of the mouth of Grand River. These galleries are placed in the sand just at the edge of the lake under the supposition that the wave action will keep the sand clean and allow the water to filter freely through to them.

For a greater part of the year the water collected seems to be of good quality, but the filtration is seriously interfered with by the building of the shore, and by the accumulation of ice over the galleries in winter. These factors render the supply inadequate and make it necessary to pump direct from the lake. As the water is in almost universal use in the three villages some attempt should be made to furnish a potable water the year around. This must be done by extending an intake into the lake for such a distance, and at such a place as will escape the sewage pollution, or by properly filtering the water at the present site.

Painesville has quite an extensive system of sanitary sewers, and Fairport and Richmond have a number of private drains in use.

In all it is estimated that some 50 percent of the total population have the use of the sewers. This sewage is sent direct to Grand River where it causes a local nuisance during low water. Whenever the lake water is used direct, or the sand covering of the galleries is not in perfect condition, the public water supply is in danger of pollution from this sewage emptied to the lake by Grand River.

Port Clinton. Population 1900, 2450: estimated population 1901, 2490.

This village is supplied with water pumped direct from Lake Erie through an intake leading to a crib located 1600 feet from the shore and 1000 feet west of the mouth of Portage River. The intake at the crib is so arranged that the water must be strained through some twelve feet of gravel before it goes to the pumps. The water is in general use by a large majority of the village's population.

There are a number of combined sewers in Port Clinton, all discharging direct into Portage River, which it is estimated are used by about one-fifth of the people. This sewage together with the refuse from the extensive fisheries is at times a serious menace to the purity of the public water supply.

The promoters of all schemes to obtain public water supplies from Lake Erie lay special stress on the fact that the general current and the prevailing winds are east, so that if the water is obtained to the west of the source of pollution, there will be but little danger of a contaminated supply.

This idea of the great prevalence of winds with an easterly component over winds with a westerly component has obtained such a strong hold on the majority of inhabitants of the lake towns that some pains was taken to investigate the subject and determine the facts in the case.

In the report of U. S. Deep Waterway Commission it is shown from the reports of the Toledo Weather Station that for the five year period 1891-95, winds from the southwest, west and northwest prevailed for 56½ percent of the time, from the southeast, east and northeast for 27 percent of the time and from north and south for 15½ percent, and that the total wind movement with a component from the west was 60½ per cent of the total movement while the total movement with a component from the east was 25½ percent, the due north or south being 14 percent. This shows that for such a period the west winds, winds from the west, prevail for a period more than twice as great as the period for east winds, and that the total movement to the east is also more than 100 percent greater than the movement to the west, but it also shows that for more than 16 months in 5 years the wind blew from the east.

Further light is thrown on this subject by reports of the Cleveland stations of the U. S. Weather Bureau.

The reports give the number of hours per month that the wind blows from the eight primary points of the compass. These figures tabulated for five years separately, for averages for two five year periods, and for the average of a ten year period are given in plates 1, 2 and 3.

In the average for ten years there are four months, June, August, September and October, in which the prevailing winds had a westerly component, that is they were from the northeast, east or southeast. And the month, January, with the greatest difference between the winds from the east and from the west gives the latter only 153 hours per month or 40 per cent excess over the winds from the east.

The average for the five years, 1896-1900, also shows the prevailing winds for June, August, September and October to be from the east, and the average for 1891-'95 show them to be from the east for June, August and September. The curves for the single years give the prevailing winds from the east for three months in 1900 to six months in 1896.

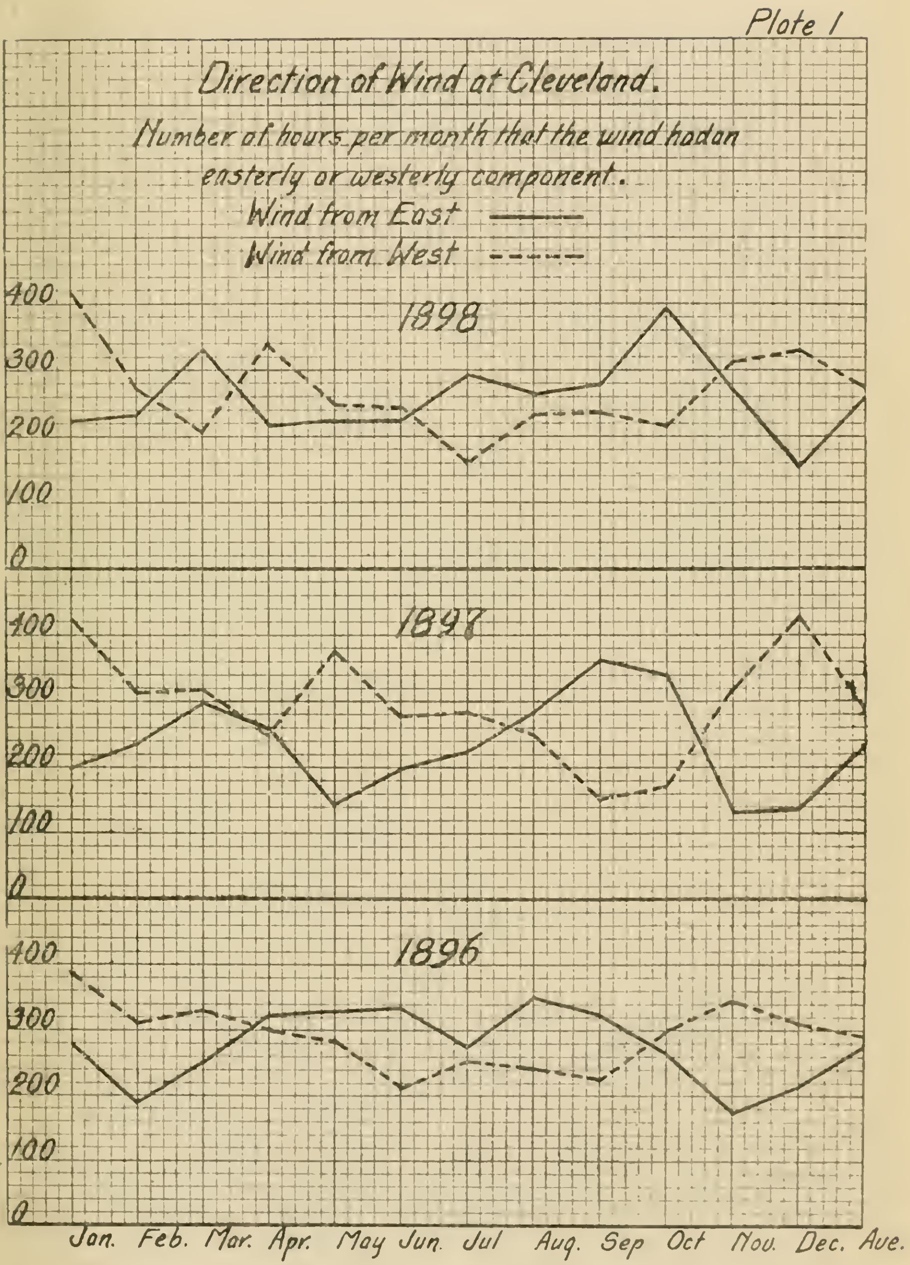
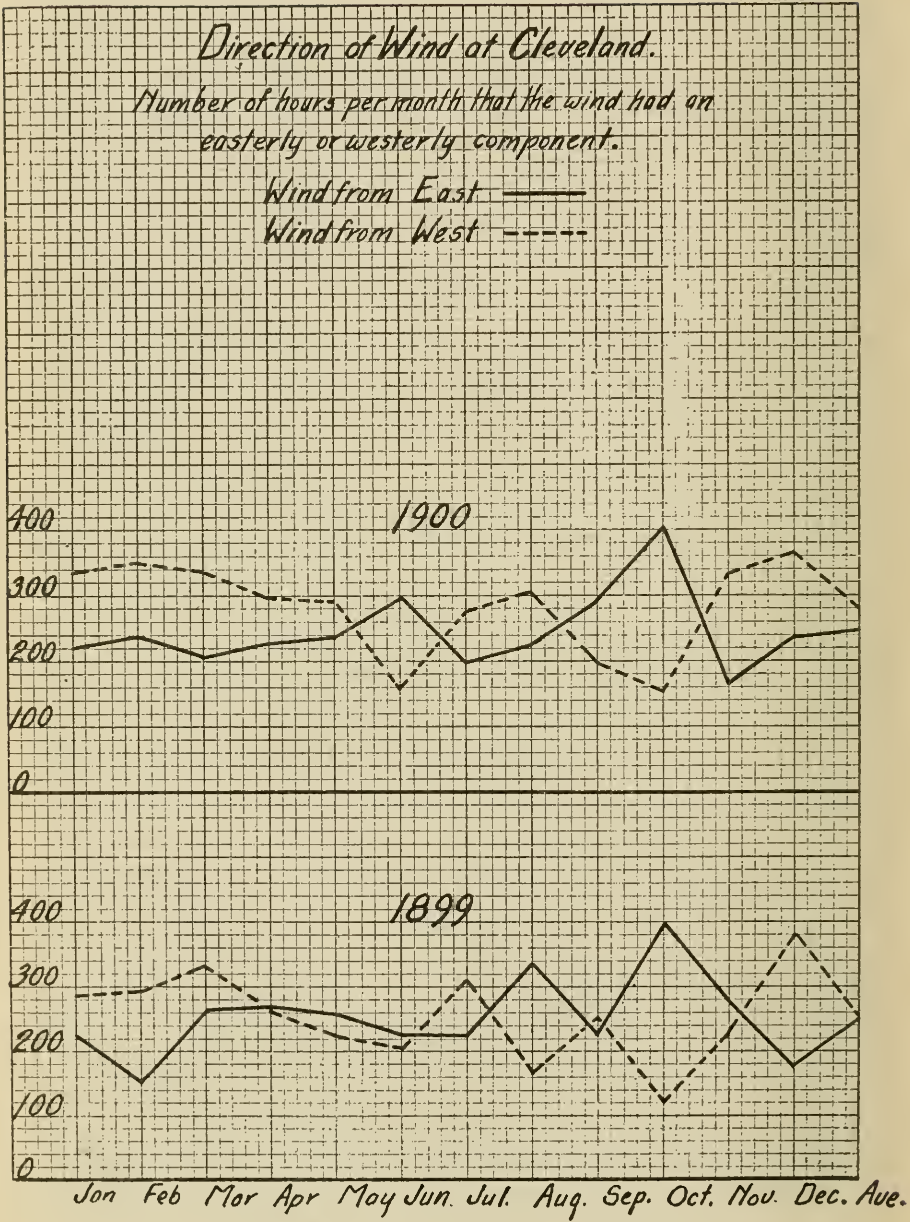

Plote 1
Direction of Wind at Cleveland.
Number of hours per month that the wind had an easterly or westerly component.
Wind from East
Wind from West
1898
1897
1896
400
300
200
100
0
Jan.
Feb.
Mar.
Apr.
May
Jun.
Jul
Aug.
Sep
Oct
Nov.
Dec.
Ave.

Plate 2


Direction of Wind at Cleveland.
Number of hours per month that the wind had an easterly or westerly component.
Wind from East
Wind from West
1900
400
300
200
100
0
1899
400
300
200
100
0
Jan
Feb
Mar
Apr
May
Jun.
Jul.
Aug.
Sep.
Oct.
Nov.
Dec.
Ave.

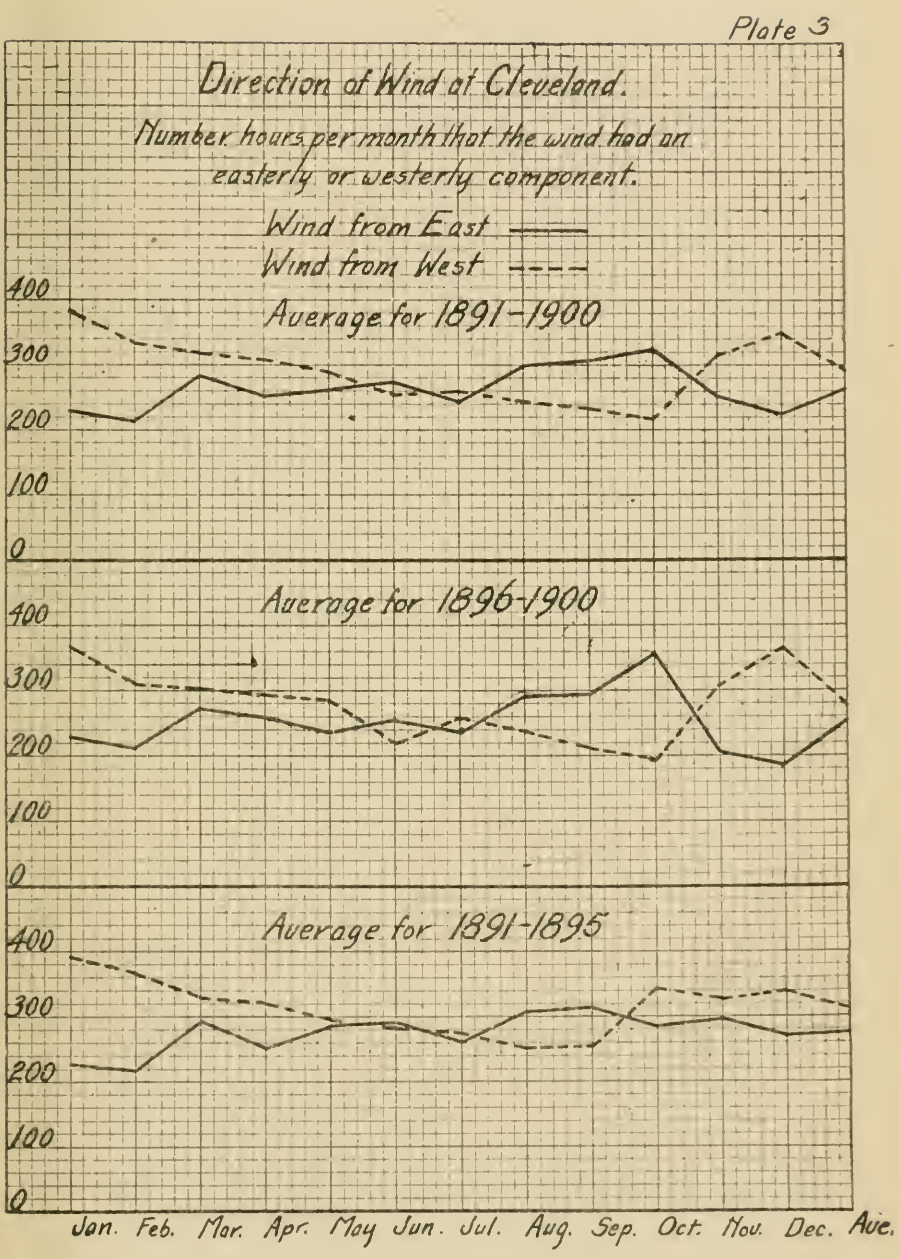


Plate 3
Direction of Wind at Cleveland.
Number hours per month that the wind had an easterly or westerly component.
Wind from East
Wind from West
Average for 1891-1900
Average for 1896-1900
Average for 1891-1895
400
300
200
100
0
Jan.
Feb.
Mar.
Apr.
May
Jun.
Jul.
Aug.
Sep.
Oct.
Nov.
Dec.
Ave.

In the averages for the year the wind is from the west for a few hours only in excess of wind from the east. On an average there is almost as much likelihood of the wind blowing from the east as from the west, and for about four months in the summer and fall there is nearly always more hours of westerly winds than easterly winds. From the figures as given it must be conceded that an intake cannot be kept free from sewage by any supposed constancy of the wind. While it is shown that the winds are from the west for a few hours more each year than they are from the east, yet there are enough hours of winds from the east to cause the surface currents to set decidedly towards the west.

No data, except that given, are available as to the total wind movement in the different directions, but the remarkable uniformity in the velocity at Cleveland would prevent any great variation in the total movement from the total time.

When, therefore, there is opportunity of sewage reaching the waterworks intake, the only hope of immunity from polluted water is to employ some reliable method of purification, and to maintain this system at a state of efficiency sufficiently high for the results that must be obtained.

Conneaut and Lorain have solved the problem by installing mechanical filters. Painesville has attempted to solve it by a system of natural filtration which is successful as far as it goes, but it is not sufficiently developed to furnish absolute protection. Cleveland hopes to solve the problem by extending her intake five miles into the lake, and by carrying the sewage ten miles to the east.

Ashtabula, Sandusky and Port Clinton are using water subject at any time to serious sewage pollution.

OHIO RIVER.

All the public water supplies of the Ohio River were included in this investigation with the one exception of Cincinnati, which has but recently concluded a very elaborate study of its water supply preliminary to the introduction of a filter plant for the Ohio River water.

The Ohio River drains such an enormous area, including so many states, and is affected by such diverse conditions that it is almost impossible to give a detailed statement of the various sources of pollution influencing the ability of the stream to furnish a potable water.

For all towns outside of Ohio there is available no information as to the existence or extent of sewers or of the number of people using them. For these cities and villages it will only be possible to give the population together with such scattered facts as are at hand.

The watershed of the Ohio River at Cincinnati extends over a large portion of Ohio, Kentucky, West Virginia and Pennsylvania, and over smaller portions of New York, Maryland, Virginia, North Carolina and probably Tennessee and has a total drainage area of about 75,700 square miles.

The Ohio River is formed at Pittsburg by the confluence of the Allegheny and Monongahela rivers and has a total length, above Cincinnati, of 448 miles or 468 miles above the Ohio-Indiana line. Of this length 431 miles form the southern boundary line of Ohio, separating this state from West Virginia and Kentucky.

The first important tributary to the Ohio is Beaver River which enters at Beaver, Pennsylvania, only twenty-four miles below Pittsburg; this stream drains, through the Mahoning River, a portion of Ohio.

The next tributary is the Muskingum which flows in from the north at Marietta, draining a large section in the eastern half of Ohio. At Parkersburg the Little Kanawha brings in the drainage of quite a section of West Virginia. Just below this the Hocking River enters from the Ohio side, and just above Gallipolis the Great Kanawha comes in from the south with water gathered from a large section of West Virginia, and smaller portions of Virginia, North Carolina and probably Tennessee.

The next three important tributaries are the Guyandotte, Big Sandy and Little Sandy, all coming in from the south with drainage from West Virginia, Virginia and Kentucky.

The Scioto joins the Ohio at Portsmouth and drains a large section of central and southern Ohio.

The next important tributaries are the Little Miami, which enters from the north above Cincinnati, and the Licking River which comes in from the south opposite the above city.

At the Ohio-Indiana line the Great Miami brings in the drainage from a large section of these two states.

Practically the entire district drained by this portion of the Ohio, under discussion, is hilly with much of it mountainous. The only extensive level portions being confined to the head waters of the northern tributaries, the Allegheny, Beaver, Muskingum, Hocking, Scioto and the Miamis.

The gradient of the stream is quite low and very uniform on the average for stations seven to forty-one miles apart. During low water it is a succession of pools connected by short stretches with a fairly good fall, and even rapids in a few cases.

The total fall for the 468 miles, Pittsburg to the mouth of the Great Miami, is 271 feet or 0.58 feet per mile.

As shown in Table I. the fall per mile varies from an average of 1.0 foot per mile for a stretch just below Pittsburg to 0.3 feet per mile for about 100 miles of the lower end.

TABLE I — APPROXIMATE GRADIENT OF OHIO RIVER.

	Station.	Elevation.	Distance.	Difference in Elevation.	Fall in feet per mile.
Confluence of Great Miami and Ohio.......	0	425	......	......	.....
Andersons Ferry	13	429	13	4	0.3
Cincinnati	20	432	7	3	0.4
New Richmond	40	438	20	6	0.3
Ripley	73	447	33	9	0.3
Vanceburg	106	457	33	10	0.3
Portsmouth	130	468	24	11	0.5
Ironton	160	483	30	15	0.5
Millersport	188	501	28	18	0.6
Point Pleasant	216	518	28	17	0.6
Pomeroy	232	526	16	8	0.5
Portland	264	546	32	20	0.6
Parkersburg	292	564	28	18	0.6
Marietta	304	570	12	6	0.5
Sistersville	336	590	32	20	0.6
Moundsville	372	614	36	24	0.7
Wheeling	383	622	11	8	0.7
Steubenville	405	641	22	19	0.9
East Liverpool	427	657	22	16	0.7
Pittsburg	468	696	41	39	1.0
Total and average	....	....	468	271	0.58

Records are available of but very few gaugings of the flow of the Ohio. A few low water discharges obtained just below Pittsburg, were as low as from 1250 to 1700 cubic feet per second or a run-off of from 0.06 to 0.09 cubic feet per second per square mile of drainage area. If such low flows as these were maintained for any length of time there would be great likelihood of a nuisance resulting from the combined urban population of Allegheny County, Pennsylvania, that is Pittsburg and vicinity.

In making a study of the population on this watershed it was found that neither the time nor maps were available for the working up of an accurate estimate of the total population, making it necessary to limit the investigation to the urban population. As has been the rule in this work urban population is defined as the number of inhabitants living in cities or villages of 1000 people or over. This limit is made with the intention of bringing in all villages which are liable to have a public water supply and more or less of a sewer system. Experience in Ohio has shown this to be the best figure, and it has been adopted, even though it may not be the proper one for the adjoining states.

Using the returns of the census of 1900 it is found that on the Ohio watershed above California, the site of the new Cincinnati water-works, the total urban population is 1,961,922. This figure represents 291 separate towns ranging in population from 1006 to 321,616. Nearly one-third of the total figure is represented by the urban towns within the boundaries of Allegheny County, Pennsylvania.

There are 36 towns clustered so closely around Pittsburg and Allegheny that for the purposes of this article they may be considered as one with a combined population of 644,274.

The other end of the stream has also a cluster of cities and towns which also could well be bunched together. In the immediate vicinity of Cincinnati there are 25 urban towns making for this district a total population of 456,926. This group need not be further considered in this study as it is below the source of all Ohio water supplies and is only a problem for Louisville and her kindred unfortunates who are compelled to go to the Ohio River for water.

Table II. shows the division of these 291 towns with respect to individual populations.

TABLE II—CLASSIFICATION OF CITIES AND VILLAGES WITH RESPECT TO POPULATION.

1,000 to 2,000	2,000 to 3,000	3,000 to 5,000	5,000 to 10,000	10,000 to 25,000	25,000 to 50,000	50,000 to 100,000	100,000 to 200,000	200,000 to 400,000
110	49	50	52	21	6	0	2	1

Of the 110 with population below 2000 it is safe to assume that 40 percent have public water supplies and produce some sewage, at least the above ratio will hold in Ohio. Of the 181 larger towns, almost all will have public water supplies and will produce sewage, and the larger the town the greater the amount of sewage produced per capita.

The distribution of the population by watersheds is briefly given in Table III. Allegheny County is considered as tributary direct to the Ohio River, though some of it is drained to both the Monongahela and Allegheny rivers.

TABLE III — POPULATION ON WATERSHEDS.

	Population.	Approximate Drainage Area.	Population per square mile.
Monongahela	138,432	7,640	18
Allegheny	256,308	11,400	22
Beaver	148,498	2,700	55
Muskingum	194,409	7,800	25
Hocking	33,349	1,180	28
Great Kanawha	32,349	12,000	3
Big Sandy	2,177	3,000	1
Scioto River	217,335	6,430	34
Ohio River, direct	938,766	18,350	51
Totals and average	1,961,922	70,500	28

The average density of the urban population for the entire watershed is 28 per square mile, with a minimum of 1 per square mile on Big Sandy, and a maximum of 55 per square mile on Beaver River watershed.

As was to be expected, it is Pennsylvania and Ohio that are responsible for a large percent of the pollution of the Ohio River. The southern tributaries from Virginia, West Virginia, North Carolina, and Kentucky are responsible for but a small portion of the urban drainage.

It is interesting to note that Allegheny County has an urban population of about 696 to the square mile.

To show the relation of the population of these cities and villages to the public water supplies under discussion, there has been prepared, Table IV, in which is given the drainage area of the Ohio River at each place together with the total urban population on same and the population per square mile.

TABLE IV — POPULATION ON DRAINAGE AREAS TRIBUTARY TO OHIO RIVER TOWNS.

Town.	Approximate Drainage Area.	Total Urban Population.	Urban Population per square mile.
East Liverpool	23,330	1,221,800	52
Wellsville	23,350	1,238,285	53
Toronto	23,680	1,250,118	53
Steubenville	23,710	1,253,644	53
Mingo Junction	23,720	1,267,993	53
Martins Ferry	24,400	1,275,310	52
Bellaire	24,800	1,325,907	53
Marietta	26,730	1,357,957	51
Pomeroy	38,900	1,612,139	41
Gallipolis	51,500	1,653,860	32
Ironton	60,000	1,696,818	28
Portsmouth	61,170	1,708,686	28
Ripley	68,700	1,954,511	29
New Richmond	69,350	1,960,006	28
California	70,500	1,961,922	28

This shows that the urban population per square mile on the watersheds above the cities from Marietta up the river remains practically constant, 51 to 53, and that it is only reduced materially by the bringing in the large thinly settled districts of West Virginia and Kentucky while the reduced density, 28 to 29, is maintained for the lower cities by the more thickly inhabited districts north of the Ohio River.

Though this general investigation has thrown much light on the possibilities of obtaining a potable water from this stream, it will require a more localized study to bring out the most important pollutions affecting each supply. While the theory of the self-purification of flowing streams has been very much exaggerated, there is certainly less danger from sewage pollution which is as distant and subject to such dilution as is the case with much that is contributed to this stream. To make more definite the relation between these sources of pollution and the public water supplies, Table V. has been prepared, in which there is given the distance in miles, by water, of the principal cities above the points where the water is taken for use.

No attempt has been made to say just what the limit is above which there will be no danger from the sewage pollution. An inspection of the table shows that the river is not free from quite recent pollution at any point where it is made use of.

As regards urban drainage, the water supplies of Pomeroy and Marietta are the most free. Each is affected by the drainage of but one small town, in the first case 28 miles above and in the second 32, while the more serious pollution is 60 to 80 miles above.

Ripley, Ironton, Gallipolis, Bellaire, Mingo Junction, Steubenville and Wellsville are each only a few miles below urban centers, and with all but Ripley, Gallipolis and Steubenville just below fair sized cities.

All the cities from Bellaire up are less than 100 miles below Pittsburg where the Ohio River is most seriously polluted with enormous amounts of both sewage and industrial wastes.

It is hard to believe that during extremely low water the purity of the stream is not affected by this for practically the whole of its length, especially as scattered along this line there are so many cities waiting to add their share of filth.

In detail East Liverpool is only 18 miles below Beaver River, where there is clustered an urban population of 29,058 in four towns, all of which are supplied with water and no doubt produce considerable sewage.

Wellsville is only four miles below East Liverpool which has an extensive system of sanitary sewers which are now used by nearly 50 per cent of the people.

Toronto is twelve miles below Wellsville which city has just completed an extensive system of sanitary sewers which are rapidly coming into use.

Toronto has a few sanitary sewers, now used by but a small portion of the people, but new connections are constantly being made, increasing the menace to the water supply of Steubenville, only seven miles below.

Steubenville does not have an extensive system of sewers but they are used by nearly one-third of the people, thus producing considerable sewage for Mingo Junction, only two miles below, to contend with.

Martins Ferry is nineteen miles below Mingo Junction and only two miles further below Steubenville, which is the most serious source of pollution, as Mingo Junction produces as yet but little sewage.

Bellaire gets full benefit of the sewage of Martins Ferry, Bridgeport and Wheeling which are from only a few rods to five miles above its intake. These cities represent a population of over 50,000 people, 80 percent of whom are accessible to sewers discharging to the Ohio and probably nearly 50 percent are making use of same. The sewage of a portion of Bellaire itself also pollutes the water supply at times.

The nearest local sewage pollution to the water supply of Marietta is at Sistersville, some thirty-two miles above. This town has a public water supply and probably sends some sewage to the river.

As the small town of Ravenswood, the first above Pomeroy, has no water supply, the nearest serious pollution is to be expected from Parkersburg, sixty miles above. This city has a water supply and produces considerable sewage.

Gallipolis must look to Pomeroy and Middleport for sewage as the first town above, Point Pleasant has no water-works and probably causes

TABLE V—DISTANCE BY WATER, IN MILES, OF SOURCES OF POLLUTION ABOVE WATER SUPPLIES.

Public Water Supplies.

Sources of Pollution.	New Richmond.	Ripley.	Maysville.	Portsmouth.	Chillicothe.	Columbus.	Marion.	Kenton.	Galion.	**Irontoo.**	Ashland.	Catlettsburg.	Huntington, etc.	Gallipolis.	Point Pleasant.	Pomeroy, etc.	Charleston.	Ravenswood.	Parkersburg.	**Marietta.**	**Athens, etc.**	Zanesville.	Newark.	New Philadelphia, etc.	Mansfield.	Canton and Massillon.	Sistersville.	Bellaire, etc.	**Wheeling, etc.**	Martin's Ferry.	Mingo Junction.	**Steubenville.**	Toronto.	Wellsville.	East Liverpool.	Beaver Falls, etc.	Salem.	Pittsburg, etc.	New Castle.	Youngstown, etc.	Niles.	Warren.	Alliance.
Population.	1,916	2,248	6,432	17,870	12,976	125,560	11,862	6,852	7,282	**11,868**	6,800	3,081	16,232	5,432	1,934	7,438	11,099	1,074	11,703	**13,348**	**12,706**	25,538	18,157	19,980	17,640	42,611	2,979	15,889	**42,837**	7,760	2,954	**14,349**	3,526	6,146	16,485	29,058	7,582	644,274	28,334	47,515	7,468	8,529	8,974
East Liverpool	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	....		....	.	18	37	40	44	55	64	70	110
Wellsville	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	..	4	22	41	44	48	59	68	74	114
Toronto	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	..	12	16	34	53	56	60	71	80	86	126
Steubenville	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7	19	23	41	60	63	67	78	87	93	133
Mingo Junction	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	9	21	25	43	62	65	69	80	89	95	135
Martins Ferry	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19	21	28	40	44	62	81	84	88	99	108	114	154
Bellaire	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	5	24	26	33	45	49	67	86	89	93	104	113	119	159
Marietta	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	32	75	77	80	99	101	108	120	124	142	161	164	168	179	188	194	234
Pomeroy	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	28	60	72	78	141	210	213	238	248	104	147	149	152	171	173	180	192	196	214	233	236	240	251	260	266	306
Gallipolis	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	18	61	45	78	90	96	159	228	231	256	266	122	165	167	170	189	191	198	210	214	232	251	254	258	269	278	284	324
Ironton	....	....	....	....	....	....	....	....	....	....	6	10	17	56	58	74	117	102	134	146	152	215	284	287	312	322	178	221	223	226	245	247	254	266	270	288	307	310	314	325	334	340	380
Portsmouth	....	....	....	....	....	....	....	....	....	28	34	38	45	84	86	102	145	130	162	174	180	243	312	315	340	350	206	249	251	254	273	275	282	294	298	316	335	338	342	353	362	368	408
Ripley	....	....	8	57	115	154	202	233	234	85	91	95	102	141	143	159	202	193	219	231	237	300	369	372	397	407	231	306	308	311	330	332	339	351	355	373	392	395	399	410	419	425	465
New Richmond	....	23	41	90	148	197	241	266	267	118	124	128	135	174	176	192	235	220	252	264	270	333	402	405	430	440	264	339	341	344	363	365	372	384	388	406	425	428	432	443	452	458	498
California	12	45	53	102	160	209	257	278	279	130	136	140	147	186	188	204	247	232	264	276	282	345	414	417	452	462	308	351	353	356	375	377	384	396	400	418	437	440	444	455	464	470	510

but little pollution. The amount of sewage from both the first mentioned towns is not great as it is not believed that more than one-tenth of the total population have the use of the few sewers in place.

Six miles above Ironton, Ashland sends to the river a considerable quantity of sewage as the city is fairly well sewered.

Ironton itself has an extensive system of sanitary sewers which are in use by at least 50 percent of the people. This sewage is sent to the river some 28 miles above Portsmouth.

The first sewage pollution above Ripley is found at Maysville, only eight miles above. While this city has a public water supply in general use it is not as yet extensively sewered.

The small amount of sewage produced by Ripley is the nearest source of pollution of the supply of New Richmond. The new water supply for California is twelve miles below the point of admission of the sewage of New Richmond, a small quantity only.

With the above facts at hand regarding the pollution of the Ohio River at each point where it is taken for a public water supply, attention will now be given to the conditions surrounding and the extent of the use of this water by the several cities.

East Liverpool. Population 16,485. This city takes the water direct from the river and pumps it to a high service reservoir of 2,500,000 gallons capacity; from this it flows to a low service reservoir of 1,500,000 capacity. During the past year a third reservoir has been constructed, increasing the storage capacity to something over six million gallons or more than two days' supply. The water is in general use for domestic purposes by a large majority of the people.

Wellsville. Population 6146. This city also pumps the water direct from the river to a distributing reservoir holding 2,500,000 gallons, which is less than a two days' supply. The water is considered very unsatisfactory and is not in general use for domestic purposes.

Toronto. Population 3526. Here also the river water is pumped direct to a distributing reservoir of about 3,000,000 gallons capacity. This is about eight days' supply and should help to furnish a better water than is usually obtained from the river, if the times for pumping are carefully selected.

Cistern water is in general use for domestic purposes, with but few using the river water.

Steubenville. Population 14,349. This city pumps the water direct from the river to a high service reservoir of 5,000,000 gallons capacity. From this it flows to lower reservoirs with a combined capacity of 2,000,000 gallons. These storage facilities are sufficient for nearly a three days' supply and should produce considerable improvement over the water direct from the river. The public supply is here in much more general use than in many of the river towns.

Mingo Junction. Population 2954. A private company supplies this village with water supposed to be taken entirely from a filter crib buried in the bed of the Ohio River, but at times it is necessary to use the river water direct. If properly constructed and used the crib could no doubt furnish a potable water. The water is pumped to a distributing reservoir of 400,000 gallons capacity, or nearly two days' supply. The water is in general use though quite unsatisfactory, probably from the use of the river water direct.

Martins Ferry. Population 7760. The water-works for this city also supplies Bridgeport, population 3963. The water is pumped direct from the river to a reservoir with a capacity of 2,500,000 gallons, which is something over a day's supply for both places.

The water is in rather general use with a number of wells and cisterns supplying much of the drinking water.

Bellaire. Population 9912. The public supply is pumped direct from the river and delivered to a distributing reservoir with a capacity of of 1,500,000 gallons, or less than a day's supply. The water is in general use for domestic purposes, though for drinking strictly, much well water is used.

Marietta. Popualtion 13,348. The water for the public supply is pumped direct from the river to two steel tanks with a combined capacity of 1,500,000 gallons, which is practically the average consumption per day.

The water is in general use for domestic purposes, but is considered very unsatisfactory.

Pomeroy. Population 4639. *Middleport.* Population 2799. Pomeroy and Middleport are supplied with water by the Pomeroy Water Company, which obtains its supply direct from the Ohio River. The water is pumped from the river to a settling tank of 235,000 gallons capacity, then filtered through a horizontal Wetherill pressure filter and finally pumped to a distributing reservoir of 275,000 gallons capacity. The filter is supposed to effect clarification without the use of alum except during the worst stages of the river. There has been no elaborate test of the filter made, but from all that can be learned it seems to be giving good results, especially during such times as alum is used. The average daily consumption is about 85,000 gallons or one-sixth the combined storage capacity. The water is in general use for domestic purposes and seems to be satisfactory.

Gallipolis. Population 5432. This city is supplied with water obtained from the sand and gravel bed of the Ohio River by means of wells or collecting galleries. The water obtained is the subsurface flow of the stream and seems to be of excellent quality, certainly clear and palatable.

It is pumped to a distributing reservoir of 2,300,000 gallons capacity, which is more than five times the average daily consumption. The water is in general use where available; many however are still using the old cisterns.

Ironton. Population 11,868. This city was formerly supplied with water pumped direct from the river to the mains. Recently, however, a storage reservoir has been provided which improves the quality slightly by means of the sedimentation offered. Cisterns filled with both river and rain water are used almost exclusively for the domestic supply.

Portsmouth. Population 17,870. The public supply is pumped direct from the Ohio River to the mains. Its quality can only be appreciated by those who have had the privilege of a personal acquaintance with this stream.

However, the public supply is in general use, many effecting some improvement by storing the same in cisterns.

Ripley. Population 2248. The public water supply is obtained from wells drilled along the edge of the Ohio River. Some of the water comes from the rock and some filters through from the bed of the river. The water is pumped by means of air lifts to two settling basins of 500,000 gallons each. From these it is forced to a storage reservoir of 1,000,000 gallons capacity. The average daily consumption is about 200,000 gallons.

The water acquires at times a bad taste on standing in the open reservoirs, and is not used extensively for domestic purposes; this supply being obtained from cisterns.

New Richmond. Population 1916. The supply is pumped direct from the Ohio River to a distributing reservoir of 700,000 gallons capacity. The average daily consumption is about 30,000 gallons or less than one-twentieth of the storage capacity. Cisterns furnish much of the domestic supply, the river water not being in general use.

The only conclusion to be arrived at from this brief investigation, is that the Ohio River, in its raw state, is not able to furnish a potable water. None of the untreated supplies can be considered as at all satisfactory and some method of bettering should be secured.

Wellsville, Marietta and Ironton are now studying the subject with the view of obtaining a less objectionable supply.

APPENDIX II.

SECOND REPORT UPON THE CONDITION OF THE

PUBLIC WATER SUPPLIES

OF OHIO.

BY THE OHIO STATE BOARD OF HEALTH.

1901.

SECOND REPORT UPON THE CONDITION OF PUBLIC WATER SUPPLIES OF OHIO.

BY BENJ. H. FLYNN, ENGINEER OHIO STATE BOARD OF HEALTH.

In this, the second report on the condition of the public water supplies of Ohio, there is included all those supplies which are from other than surface sources, and which have not been included in any of the special reports on the sanitary investigations of the Sandusky, Maumee, Muskingum, Great Miami and Little Miami watersheds. There will however be included the few surface supplies which have been installed since the first report in 1898.

This second report covers the water supply of fifty-four cities and villages supplied from forty-seven separate water-works. The Cincinnati water-works supplies two of the villages included in the above, College Hill and Winton Place, and as this system has been previously reported on, nothing further will be given here, especially as the new plant has not yet been completed. The fifty-four towns in this list have, by the 1900 census, a total population of 144,261, or an average population of only 2,672. The largest cities and villages included are Chillicothe, with a population of 12,976, then Bowling Green, Delaware, Galion and Washington C. H., with populations between 5,000 and 10,000; the remaining villages, forty-nine, all having populations below 5,000. All but seven, however, are classed as urban, as their separate populations are in excess of 1,000. Those not classed as urban are Arlington Heights, Caldwell, Greenwich, Hiram, Milan, Milford Center and Mt. Sterling, having in all a population of 5,116 or an average of 731. In reference to the source from which the water is obtained the usual divisions are made, namely: Surface and Ground, with the latter subdivided into Subsurface and Deepseated; the last two divisions depending upon the depth at and the strata beneath which the water is found.

In the following table No. I. the above divisions have been made in accordance with the best information obtainable by inquiry and inspection.

On account of the small number of surface supplies, and especially on account of the recent installation of the same, no comparison can be made of the relative sizes of the towns in the various classes. It is evident however that there are a large number of the villages of the state that are supplied with "ground" water. From the previous studies along this line it is found that while the smaller cities and the villages can obtain a satisfactory supply of water from under-ground sources, it is usually difficult for the larger cities to find a supply sufficient for their needs. There are a few exceptions to this rule; Dayton, Springfield, Mansfield, Hamilton, etc., but the majority of the larger places use surface water entirely, or depend upon it to help out the shortage in the ground supply. Even Springfield with its excellent supply, was at last compelled to use a small amount of surface water.

Another feature to note in Table I. is the large number of towns in the "deep-seated" division. Where the industrial use is not important, this class of water usually furnishes an excellent supply. It is not easily liable to pollution from surface sources, not so easily affected by local droughts, and it is usually clear and palatable, especially after one is accustomed to each individual water. The objections to it are probably confined to the high cost of pumping, usually two lifts, its tendency to a high mineral character, and the difficulty of storing it in open reservoirs.

The five cities which use both subsurface and deep-seated water originally had but the subsurface supply and were compelled to seek the deeper waters in order to have sufficient in the dry seasons.

While Mingo Junction has been placed in the surface and subsurface class, it is uncertain whether it belongs here or not. Its water supply is obtained from a filtering crib sunk beneath the bed of the Ohio River, and the water collected by it seems to be in part the subsurface flow of the stream and, in part, the river water which has filtered through the sand and ground above the crib.

DETAILED DESCRIPTION OF PUBLIC WATER SUPPLIES.

Under this heading there is given a rather detailed description of the various supplies, together with a tabulated statement of the principal items followed by a discussion of some of the results brought out. Tables will also be given showing some of the important features of the franchises granted to the private companies and also the water rates charged by the various boards and companies.

Athens. Population 3066. The public water supply was put in by the village in 1894 and has cost to date some $45,000, which is a per capita cost of $14.67.

The supply is obtained from a large dug well, thirty feet in diameter, 23 feet deep, located in the low land between a loop of the Hocking River in the western part of the village. The well is dug through some 11 feet of surface soil and clay, and 12 feet into a rather extensive bed of gravel. The well is of the usual brick construction, covered with a shingle roof. The normal level of the water is 6 feet from the surface, but the steady pumping has lowered it much below this and in dry seasons the level falls to within 18 inches of the bottom. At one time it was attempted to increase the capacity of the well by sinking a cylinder in the bottom of the same, but a sudden rise of the water level stopped work and it has not been taken up since. It is now proposed to increase the supply by putting down a number of driven wells.

TABLE I — CLASSIFICATION OF PUBLIC WATER SUPPLIES.

Surface		1	College Hill	1,104		
		2	Lakeside	1,000		
		3	Middleport	2,799		
		4	New Richmond	1,916		
		5	Pomeroy	4,639		
		6	Wellington	2,094		
		7	Winton Place	1,219		
			Total			14,771
			Average			2,110
Ground	Sub-surface	1	Athens	3,066		
		2	Chagrin Falls	1,586		
		3	Columbiana	1,339		
		4	Corning	1,401		
		5	East Palestine	2,493		
		6	Glouster	2,155		
		7	Hiram	659		
		8	Logan	3,880		
		9	Milford Center	682		
			Total		16,861	
			Average		1,873	
	Deep-seated	1	Arlington Heights	360		
		2	Bond Hill	1,081		
		3	Bowling Green	5,067		
		4	Cadiz	1,755		
		5	Carthage	2,559		
		6	Celina	2,815		
		7	Chicago Junction	2,348		
		8	Clyde	2,515		
		9	Elmwood Place	2,532		
		10	Gibsonburg	1,791		
		11	Glendale	1,545		
		12	Hartwell	1,833		
		13	Jackson	4,672		
		14	Leipsic	1,726		
		15	Lockland	2,695		
		16	Marysville	3,048		
		17	Medina	2,232		
		18	Mt. Sterling	986		
		19	North Baltimore	3,561		
		20	Plain City	1,432		
		21	Reading	3,076		
		22	Rockford	1,207		
		23	Sabina	1,481		
		24	St. Bernard	3,384		
		25	Wyoming	1,450		

The well is removed from local pollution and the water should be of excellent quality. The water is pumped from the well to a standpipe by two horizontal compound duplex Gordon pumps of 1,500,000 gallons capacity each.

The standpipe is 16 2-3 feet in diameter by 60 feet high and holds some 95,000 gallons.

The average domestic pressure is about 70 pounds.

There are 4.5 miles of mains in, giving some 95 per cent of the people access to the water. There are 600 services in, of which 575 are in use and 150 of these metered.

The average daily consumption is 260,000 gallons which is 452 gallons per service, 90 per consumer and 85 gallons per capita of the total population of the village.

The private water supply is not important as can be seen from the large number of consumers.

Berea. Population 2510. The public water supply and electric light plant were put in by the village in 1900 at a total cost of $42,000, of which $30,000, or a per capita cost of $11.95, was for the water-works.

The supply is from an abandoned stone quarry and from Rocky River and is for fire protection and general use only; its use for domestic purposes is prohibited by ordinance passed by order of the State Board of Health.

The stone quarry is in the famous Berea sandstone and it was at first thought that the seepage from the surrounding rock and from Baldwin Creek and the Rocky River adjacent, would furnish a sufficient supply without recourse to the river, but the action was too slow and the quantity of water deficient.

If the quarry was protected from all surface drainage and the river water was kept out its use might have been permitted, but under the present condition it was not considered potable and filtration would be required. It is claimed that an excess of mineral matter prevents the use of the deeper waters from the sandstone.

The water is pumped direct from the old quarry by a horizontal compound duplex Snider-Hughes pump of 750,000 gallons capacity. The average pressure maintained is 50 pounds.

There are 5.5 miles of mains in, giving some 50 percent of the people access to same.

There are 53 services in, all of which are in use and 36 metered.

It was impossible to obtain figures on the average daily consumption.

The domestic water supply is obtained from wells dug from 20 to 30 feet into clay, gravel and shale, and from a few drilled from 40 to 50 feet deep, the lower part of which are in the sandstone. All the water is hard and contains considerable iron.

Bowling Green. Population 5067. The public water supply was put in by a private company, the Bowling Green Water Company, in 1893, and has cost to date some $75,000 which is a per capita cost of $14.80.

The present supply is from a group of nine deep wells located on about a ten acre tract of land just west of the corporation line. Eight of the wells are 6 inches in diameter and one 9 inches, and all are drilled from 213 to 240 feet deep through limestone and down to a bed of shale. The normal level of the water is 28 feet from the surface and it is lowered much below this by the ordinary consumption.

The original supply was from twenty-one wells drilled about 71 feet into the same formation and pumped by direct suction, but these failed to give enough water and the deep wells were put down in 1895.

The deep wells are pumped by nine Laidlaw-Dunn-Gordon deep well pumps, eight of which are of 50,000 gallons capacity and one of 100,000 gallons capacity. These pumps are covered with little frame sheds and are supplied with steam from the central station, 500 feet from the most distant well. The water was pumped at first into a small brick cistern 24 feet in diameter and 19 feet deep, capacity 62,000 gallons, but during the last year a large open brick reservoir of 1,000,000 gallons capacity has been constructed, which will be used in connection with the cistern.

From these reservoirs the water is pumped to the standpipe and mains by two horizontal compound duplex Laidlaw-Dunn-Gordon pumps of 1,000,000 gallons capacity each. The standpipe is 16 feet in diameter and 110 feet high, with a capacity of 165,000 gallons. The average pressure on the mains is 45 pounds.

There are 7.0 miles of mains in, giving some 75 percent of the people access to the water.

There are 540 services in, of which 485 are in use and one of these metered.

No record is kept of the amount of water pumped.

Where available, the public supply is in general use for domestic purposes. Quite a number however must use water from shallow wells both dug and driven into the soil above the rock and into the rock itself where the latter is close to the surface.

Cadiz. Population 1755. The public water supply was put in by the village in 1895 and has cost to date some $43,000, which is a per capita cost of $24.50.

The supply is obtained from five 6-inch wells 212 feet deep, and from one 8-inch well 265 feet deep, all located in the northern part of the village. The wells go through various strata of sand, limestone, coal, etc., finding most of the water in a gray sand some 90 feet below the surface. The level of the water is usually from 50 to 90 feet from the surface and it is lowered to some 110 feet by ordinary pumping in the dry season.

The water is pumped from the wells to a receiving basin by air lifts supplied from two Knowles air compressors. From the reservoir the water is pumped direct to the mains by two horizontal compound duplex Worthington pumps of 750,000 gallons capacity each. The average pressure maintained on the mains is 60 pounds.

There are 5.2 miles of mains in, giving some 95 percent of the people access to the water. There are 350 services in, all of which, it is claimed, are in use and some 160 of these metered.

It is estimated that the average daily consumption is 60,000 gallons which is 171 gallons per service, 43 per consumer and 34 per capita of the village's population.

Caldwell. Population 927. The public water supply was put in by the village in 1897 and has cost to date, together with an electric light plant, some $14,000, which is a per capita cost of $15.10.

The supply is obtained from a 15-foot well, dug some 20 feet deep in the low land bordering Duck Creek above the village. This supply is supplemented to some extent with infiltration water from the creek, and in times of low water, with the creek water direct. To increase the infiltration water from the creek, a so-called filter was installed, consisting of a quantity of gravel dumped into a semi-elliptical excavation in the creek bank, and protected from the wash of the creek by crib work. It is said that the filter has 200 square feet of usable area, but the whole work is covered over and no accurate data could be obtained concerning it. From the bottom, or back of this filter, a drain for the filtered water leads to the well.

There appears to be no way by which the filter can be thoroughly cleaned and its action must necessarily decrease with the use of the turbid creek water.

The water is pumped from the well to a reservoir by a horizontal compound duplex Snider-Hughes pump of 500,000 gallons capacity.

The reservoir consists of a covered brick cistern, 46 feet in diameter and 17 feet deep, with a capacity of 210,000 gallons, and located on a high hill west of the village.

There are 4.0 miles of mains in, giving some 80 percent of the population access to the water.

There are 125 services in, all of which are in use, but none metered.

The average daily consumption could not be obtained. Private wells supply nearly all the water used for domestic purposes, these are either dug a few feet into the limestone or drilled from 40 to 60 feet into the same rock.

There are some ten water-closets in use, nearly all of which are sewered through private drains to Duck Creek.

Carthage. Population 2559. The public water supply was put in by the village in 1890, and has cost to date some $23,000, which is a per capita cost of $8.99.

In 1898 a contract was entered in with Elmwood Place, under which that village is now supplied with water.

The Carthage supply is obtained from three 8-inch wells and one 6-inch well, all drilled from 136 to 138 feet trough blue clay and gravel into a bed of coarse gravel in which the water is found. The wells are located in the eastern part of the village, where there is some chance for surface pollution, but it is not at all probable that the deeper-seated waters are affected. The water is usually 50 feet from the surface and it is lowered but little by the ordinary consumption.

The water is pumped from the wells to a receiving basin by four deep well pumps, three Laidlaw-Dunn-Gordon pumps and one Bradford, and each of about 175,000 gallons capacity.

From the basin the water is pumped direct to the mains, by two horizontal duplex Laidlaw-Dunn-Gordon pumps of 1,000,000 gallons capacity each. The average pressure on the mains is 60 pounds. The receiving well is a covered brick basin 25 feet in diameter and 17 feet deep, with a capacity of 60,000 gallons.

There are 7.0 miles of mains in, giving some 90 percent of the people access to the water. There are 330 services in, 325 of which are in use, and 30 of these metered.

It was impossible, from lack of records, to estimate the average daily consumption.

The village water is being put into general use, where available, to the gradual extinction of the private wells.

Elmwood Place. Population 2532. The public water supply was secured by the village from Carthage in 1898. The distribution system cost $15,000, which is a per capita cost of $5.92.

There are 6.0 miles of mains in, giving some 90 percent of the people access to the water. There are 251 services in, all of which are in use, and two metered.

The private water supply is obtained from wells dug from 10 to 30 feet deep.

Celina. Population 2815. The public water supply was put in by the village in 1895, and has cost to date about $50,000, which is a per capita cost of $17.76.

The supply is obtained from five 6-inch wells located in the northwestern part of the village. These are drilled from 192 to 312 feet deep, striking the limestone at from 32 to 48 feet below the surface. The water is found in the limestone, and comes to within 27 feet of the surface when the wells are not being pumped, and it is lowered some 60 feet by the ordinary consumption.

The water is pumped from the wells to a receiving basin by an Ingersoll-Sargeant air life, and from the basin to a standpipe by two horizontal compound duplex Laidlaw-Dunn-Gordon pumps of 1,000,000 gallons capacity each. The receiving basin is 25 feet in diameter, 25 feet deep, with a capacity of 90,000 gallons, and it is constructed of brick laid in cement and covered with a conical board roof. The standpipe is 125 feet high, 16 feet in diameter, and holds some 185,000 gallons.

The average pressure on the mains is 65 pounds. There are 8.5 miles of mains in, giving some 80 percent of the people access to the water.

There are 188 services in, of which 173 are in use, and 27 of these metered.

The average daily consumption is 100,000 gallons, which is 577 gallons per service, 115 per consumer, and 35 per capita of the village's population.

The public supply is used for domestic purposes where available.

There are a few private wells in use, but quite a number use cistern water on account of the excessive hardness of both the public and private well waters.

Chagrin Falls. Population 1586. The public water supply was put in by the village in 1897, and has cost to date some $35,000, which is a per capita cost of $22.06.

The supply is obtained from ten springs located in the valley of Spring Brook, some three and one-half miles east of the village. The springs emerge from sandstone outcrops, and the water is conducted through 6, 8 and 10-inch iron and tile pipe to a receiving well, from which it is pumped to a reservoir one mile east of the village, by a horizontal compound duplex Worthington pump of 750,000 gallons capacity.

The receiving well is a brick cistern 30 feet in diameter, 15 feet deep and covered with a board roof. The springs are scattered over 20 acres of ground which is used for pasture. There seems to be no other chance for the pollution of the water as the nearest house is one-quarter of a mile away.

The distributing reservoir is 46 feet in diameter, 17 feet deep, and holds 204,000 gallons, this also is lined with brick and roofed over.

The average pressure on the mains is 100 pounds. There are 8.5 miles of mains in, giving some 95 percent of the people access to the water. There are 278 services in, of which 253 are in use, and ten of these metered.

The average daily consumption is 78,000 gallons which is 608 per service, 101 per consumer, and 49 gallons per capita of the total population.

The private supply is from wells, both dug and drilled, from 14 to 30 feet deep, a few reaching the rock.

Chicago Junction. Population 2348. The public water supply was put in by the village in 1899, and has cost to date some $35,000, which is a per capita cost of $14.91.

The supply is obtained from seven 6-inch wells drven from 52 to 73 feet deep through various strata of blue and yellow clay and into a stratum of coarse gravel. The wells are located in the eastern part of the village, in the valley of a small run, and are removed from local pollution. The water flows from these wells, by gravity, to a large receiving basin, from which it is pumped to the mains and water-tower by a horizontal duplex Stillwell-Bierce & Smith-Vaile pump of 1,000,000 gallons capacity.

The receiving well is a covered brick basin 12 feet deep and 50 feet in diameter, with a capacity of 175,000 gallons. At times it has been found necessary to increase the flow of the wells by pumping, and a Stillwell-Bierce & Smith-Vaile pump of 500,000 capacity has been installed for this purpose.

The water-tower consists of a tank 25 feet high, 20 feet in diameter, and holding 90,000 gallons, placed on a 75-foot trestle, where it gives an average pressure on the mains of 40 pounds.

There are 5.8 miles of mains in, giving 85 percent of the people access to the water. There are 286 services in, all in use, and 15 metered.

No record is kept of the daily consumption.

The private water supply is obtained from a number of rather deep drilled wells, there being but very few shallow dug wells in use.

Chillicothe. Population 12,976. The public water supply was put in by a private company, — the Chillicothe Gas Light and Water Company — in 1882, and has cost to date some $300,000, which is a per capita cost of $23.12.

The original supply was from a 23 foot well dug some 26 feet deep into the gravel bed along the river bottom in the northern part of the city. This failed to supply enough water and in 1895 four 8-inch wells were driven some 80 to 100 feet in the bottom of the large well, and later four more of the same character were added.

The large well is walled with brick and housed over. It is located in a city park so that it is quite free from pollution. The water is pumped direct from the well to the reservoir and the mains by two horizontal compound duplex Worthington pumps of 2,000,000 and 1,500,000 gallons capacity, respectively.

The reservoir is an open brick and concrete basin 200 by 220 by 12 feet deep, holding some 3,500,000 gallons. It is 212 feet above the pumping station, and furnishes an average pressure on the mains of 95 pounds.

There are some 23.0 miles of mains in, giving some 95 percent of the people access to the water. There are 1500 services in, 1400 of which are in use, and 40 of these metered.

No record is available from which to estimate the average daily consumption.

There are a number of private wells still in use, these are both dug and driven, from 20 to 40 feet deep, and usually find their water in the river gravel.

Clyde. Population 2515. The public water supply was put in by the village in 1884, and has cost to date $37,000, which is a per capita cost of $14.71.

The present supply is from one 10-inch well, 231 feet deep, located near Raccoon Creek in the southwestern part of the village. This well strikes the limestone at 60 feet, and continues in this same stratum all the way.

The water rises to within 3 feet of the top and is lowered some 80 feet by the maximum consumption.

The original supply was from a 15-foot dug well 45 feet deep, with five 6-inch wells driven to the rock in the bottom of this. This supply failed and the deep well was put down in 1896.

The water is pumped from the 10-inch well to the old dug well by a Downie deep well pump of 400,000 gallons capacity.

From the dug well, which now acts as a receiving basin only, the water is pumped direct to the mains by a horizontal duplex Gordon pump of 500,000 gallons capacity, and one of 1,000,000 gallons capacity.

For a reserve supply in case of fire or other emergency, direct connection can be made to an open reservoir filled with well water and some surface drainage. This basin is nearly 200 feet square, and from 4 to 8 feet deep, giving a capacity of some 800,000 gallons. Direct connection can also be made with a pond formed by a small dam in Raccoon Creek. This water is used in the water-works boilers on account of the hardness of the well water.

There are eight miles of mains in, giving some 95 percent of the people access to the water. There are 552 services in, of which 500 are in use, and 20 of these metered.

It was impossible to estimate the average daily consumption.

There are but a few private wells in use, on account of the good quality and general use of the public supply. The few in use are dug from 10 to 20 feet in the drift.

College Hill. Population 1104. The public water supply was put in by the village in 1900, and has cost to date some $50,000, which is a per capita cost of $45.29. This excessive cost cannot be explained, especially as the water is secured from the Cincinnati works.

As stated the water is supplied from the Hyde Park service of the Cincinnati water-works, being received into a covered basin in College Hill, and repumped from there to the mains and elevated tank by a Laidlaw-Dunn-Gordon triplex power pump of 400,000 gallons capacity. The water, by the time it reaches the consumers, has had so many opportunities for sedimentation that it is fairly clear and would hardly be recognized as from the Ohio River.

The receiving basin is a covered brick cistern 32 feet in diameter and 20 feet deep, holding some 116,000 gallons. The power pump is operated by a gasoline engine. The water-tower consists of a steel tank 32 feet deep, 23 feet in diameter, holding some 100,000 gallons, placed on a trestle of such height that the top of the tank is 175 feet from the ground. The average pressure on the mains is 70 pounds.

There are 8.0 miles of mains in, giving some 80 percent of the people access to the water. There are 61 services in, all of which are in use, and all metered. It was impossible to obtain an accurate estimate on the average daily consumption.

Notwithstanding the improved quality of the water, nearly all the domestic supply is obtained from cisterns and wells.

Winton Place. Population 1219. This village secured a supply of water from the Cincinnati works in 1896. The village owns its distribution system, which was put in at a cost of about $25,000, or a per capita cost of $20.51.

The village pays Cincinnati $2 per year for each fire hydrant, and private consumers pay 10 percent increase over the Cincinnati rates.

There are 6.5 miles of mains in giving some 90 percent of the people access to the water. There are 139 services in, all of which are in use, but none metered.

As in Evanston and Hyde Park, water is supplied to Winton Place as if it were a part of Cincinnati.

Columbiana. Population 1339. The public water supply was put in by the village in 1895, and has cost to date, including an electric light plant, some $38,000, which is a per capita cost of $28.38.

The supply is obtained from a large well, 30 feet in diameter and 30 feet deep, blasted out of the sandstone and located in the southwest part of the village, where the pollution is limited to a few vaults and barn yards. The well is walled with brick and roofed over, keeping out the surface drainage, compelling the water to enter from the bottom. The level of the water varies from 12 to 15 feet below the surface, depending on the season and the consumption.

The water is pumped direct from the well to the mains by two horizontal compound duplex Smith-Vaile & Stillwell-Bierce pumps of 750,000 gallons capacity each. The average pressure maintained on the mains is 50 pounds.

There are 5.0 miles of mains in, giving some 90 percent of the population access to the water.

There are 110 services in, all of which are in use, and 2 metered.

The average daily consumption is 21,000 gallons, which is 191 gallons per service, 38 gallons per consumer, and 16 gallons per capita of the village's population.

The private water supply is from dug wells, 18 to 25 feet deep.

Corning. Population 1401. The public water supply was put in by the village in 1892, and has cost to date some $10,000, which is a per capita cost of $7.14.

This low figure is due to the fact that the water is not used for domestic purposes, necessitating only a few mains and a small plant for fire protection.

The supply is obtained from a 6-foot dug well 22 feet deep, a 9 by 18 foot dug well 32 feet deep, and a 8-inch drilled well 45 feet deep, all in the southern part of the village near Sunday Creek. The wells are in sandstone and gravel, and the water is more or less impregnated with salt, especially that from the drilled well. The dug wells go dry in the summer and fall, and the supply from the deep well is inadequate during those periods.

The water is pumped direct from the wells to two wooden tanks by a small Pulling pump of 150,000 gallons capacity.

One tank is located on the hills to the east of the village, and the other on the west side of the village.

The east tank is 24 feet in diameter and 16 feet deep, with a capacity of about 50,000 gallons, and it is 234 feet above the pumping station. The west tank is 22 feet in diameter, 16 feet deep, capacity 45,000 gallons and is 160 feet above the station.

The east tank is held in reserve in the summer and the west in the winter.

There are 1.3 miles of mains in, giving some 75 percent of the population access to the water.

There are 13 services in, all of which are in use and none metered. Eight of the services are in use for sprinkling only, the remaining five are in use for washing purposes, etc., but not for domestic use.

No record is kept of the consumption. The domestic water supply is obtained from private wells dug 12 to 20 feet into the gravel and rock.

Delaware. Population 7940. The public water supply was put in by the "Delaware Water Company" in 1889, and has cost to date some $175,000, which is a per capita cost of $22.04.

The original supply was obtained from a well and gallery on the bank of the Olentangy River, some three miles north of the city. The well is 25 feet in diameter and 24 feet deep, excavated through the soil and gravel down to the rock, and 3 feet into same. The walls are laid up in brick, and the whole covered with a conical board roof. The gallery, leading to this well, runs parallel to the river bank, and is 4 feet wide, 6 feet high and 293 feet long. This is also excavated about 3 feet in rock with side walls built up of loose stone and the top covered with slabs of stone.

This original supply, not being sufficient at all times, was added to in 1896 by a 6-inch well drilled 255 feet deep, 235 feet of which was in the limestone. The water flows naturally from this at the rate of about 65,000 gallons per day, and it can be pumped by the air lift at the rate of 700,000 gallons per day. The supply from the gallery and large well varies from 200,000 to 800,000 gallons per day, depending on the season, so that, for a great deal of the time, the air lift does not have to be run.

The air lift is supplied by an Ingersoll-Sargeant compresser, which furnishes per minute, 285 cubic feet of air at 100 pounds pressure.

The water from the deep well is pumped to the large well from which the combined waters are pumped to a standpipe by two horizontal compound duplex Deane pumps of 2,000,000 gallons capacity each.

There is a direct connection between the pump well and the river for use in cases of emergency.

The standpipe is located on high ground between the pumping station and the city, and is 20 feet in diameter and 100 feet high, with a capacity of 235,000 gallons.

There are 19.0 miles of mains in, giving some 90 percent of the population access to the water. There are 902 services in, of which 776 are in use and 337 of these metered.

The average daily consumption is 421,000 gallons, which is 542 gallons per service, 108 per consumer and 53 per capita of the total population.

Three railroads are supplied with water, which accounts for the high consumption for a place of this size and with so many services metered.

The water is in general use, where available, and seems to be of good quality. Private wells are usually dug or driven from 20 to 40 feet deep, obtaining their water from the drift.

East Palestine. Population 2493. The public water supply was put in by the village in 1889, and has cost to date some $25,000, which is a per capita cost of $10.03.

The original supply was from four 4-inch wells drilled 100 feet deep into an extensive bed of gravel. These failed to supply enough water, and in 1892 a large well 22 feet in diameter, and 22 feet deep was dug in the same place, and seemingly, an abundance of water secured, for the present at least.

The normal level of the water is about 16 feet from the surface, and it can be lowered easily by the pumps, but it soon fills up again.

This large well is walled up with brick and arched over, keeping out all surface drainage, and as it is removed from all local pollution it should furnish a good water.

The water is pumped direct from this well to a reservoir by a horizontal duplex Gordon pump of 750,000 gallons capacity, and a horizontal compound duplex McGowan pump of the same capacity.

The reservoir is constructed of brick laid in cement covered with a slate roof, and is located on a hill south of the village, where it furnishes an average pressure on the mains of 85 pounds. It is 50 feet in diameter, 24 feet deep, and has a capacity of 350,000 gallons.

There are 4.5 miles of mains in, giving some 95 percent of the people access to the water.

There are 400 services in, all of which are in use, and 4 metered.

The average daily consumption is 137,000 gallons, which is 342 gallons per service, 68 per consumer and 55 per capita of the village's population.

As seen from the number of services there are but few private wells in use.

Galion. Population 7282. The public water supply was put in by a private company, "The Galion Water Works Company," in 1882, and has cost to date about $100,000, which is a per capita cost of $13.73.

The present supply is obtained from three 6-inch wells and two 8-inch wells, all from 70 to 90 feet deep.

These wells are pumped by a Smith-Vaile & Stillwell-Bierce air lift to a receiving reservoir, from which the water is repumped to an elevated tank by two horizontal duplex Deane pumps of 1,500,000 gallons capacity each.

The original supply for the plant was from a large dug well, 28 feet in diameter and 28 feet deep. This well goes through various strata of clay and gravel into a large bed of gravel, and can still supply some water for use in emergencies. Later a large number of driven and drilled wells were put down, some of which went into the rock which is found about 70 feet below the surface.

Of these deep wells, five are in use, being pumped by the air lift, and three 6-inch wells are still available for an extension of the air lift system.

The receiving basin, for the air lift discharge, is a covered brick cistern, 40 feet in diameter and 18 feet deep with a capacity of 150,000 gallons.

All the wells are located in the northwestern part of the city, near the Olentangy River.

The elevated tank is 62 feet high and 25 feet in diameter with a capacity of 155,000 gallons, and is placed on a tower 100 feet high.

The average pressure on the mains is 65 pounds.

There are 14.0 miles of mains in, giving some 90 percent of the people access to the water. There are 490 services in, 430 of which are in use and 48 of these metered.

The average daily consumption is 275,000 gallons, which is 640 gallons per service, 128 per consumer and 38 gallons per capita of the city's population.

Owing to the unsatisfactory condition of the supply for a number of years, there are a large number of private wells in use, but these are now gradually being abandoned.

Gibsonburg. Population 1791. The public water supply was put in by the village in 1897, and has cost to date some $28,000, which is a per capita cost of $15.63.

The supply is obtained from one 10-inch well drilled through a few feet of drift, then into limestone, making 287 feet in all.

The water is pumped from this well to a receiving basin by a Gould double acting deep well power pump of 125,000 gallons capacity, and from the basin to a standpipe by a Gould triplex power pump of 150,000 gallons capacity. Both pumps are operated by gasoline engines, the first by means of a belt and gearing, but the latter is direct connected.

The receiving basin is 30 feet in diameter, 18 feet deep and holds some 84,000 gallons. It is constructed with brick walls laid on the bed rock, and it is covered with a tin roof. The standpipe is 110 feet high, 13 feet in diameter, and holds some 110,000 gallons.

The average domestic pressure on the mains is 45 pounds.

A second ten-inch well, 311 feet deep, has been drilled near the first one, which it is intended to use as soon as needed. This well will be pumped by means of an air lift.

There are 4.5 miles of mains in, giving some 95 percent of the people access to the water.

There are 226 services in, 212 of which are in use and 4 of these metered. The average daily consumption is 31,200 gallons, which is 147 gallons per service, 29 per consumer and 17 gallons per capita of the village's population.

The public supply seems to be of excellent quality, and is in general use where available.

The private wells also furnish a much better water than is usually found, as they are drilled from 25 to 60 feet into the rock.

Glendale. Population 1545. The public water supply was put in by the village in 1892, and has cost to date $41,000, which is a per capita cost of $26.54.

The supply is obtained from one 3-inch well and two 8-inch wells, drilled 175 feet deep into extensive beds of sand covered with a few strata of gravel and clay.

The wells are located one and one-half miles east of the village in the valley of Mill Creek, and are entirely removed from surface pollution. The water is pumped direct from the wells to the mains and standpipe by a horizontal compound duplex Gordon pump of 500,000 gallons capacity, and by a horizontal duplex Gordon pump of 500,000 gallons capacity.

The usual level of the water is 12 feet from the surface, and at times it is lowered to the suction limit of the pumps, or some 35 feet, as the pumps are set 9 feet below the surface.

The standpipe is 80 feet high, 17 feet in diameter and holds some 135,000 gallons. It is situated on such high ground that the average pressure on the mains is 60 pounds. It is 110 pounds at the pumping station.

There are ten miles of mains in, giving some 80 percent of the people access to the water.

Of the above, 1.5 miles is discharge main, leading from the pumping station to the village.

There are 175 services in, all of which are in use and two of these metered.

No record is kept of the daily consumption.

The private water supply is from the shallow dug and driven wells so common in the drift of Mill Creek valley.

Glouster. Population, 2155. The public water supply was put in by the village in 1900, and has cost to date some $18,000, which is a per capita cost of $8.35.

Like its neighboring village of Corning, this village has a supply for fire protection only, the use of the water for domestic purposes being prohibited.

The supply is obtained from the abandoned workings of a coal mine just west of the village, the water being originally pumped out to keep the workings drained. Advantage was taken of this by the village to secure fire protection and an agreement was made with the mine company to pump the water to a reservoir, built by the city, on a hill north of the village, for a consideration of $60 per month.

The pump in use is a small Knowles, of some 150,000 gallons capacity, working under a head of 250 feet; 75 feet to the surface, and 175 feet more to the reservoir.

The reservoir is elliptical in shape, 32x62 by 11 feet deep, and has a capacity of some 125,000 gallons. It is constructed of brick laid in cement, plastered, and covered with a shingle roof.

There are some 4.0 miles of mains in, giving about 80 percent of the population access to the water. There are 38 services in, all of which are in use, and none metered.

The water for domestic use is obtained from shallow dug wells, many of which are badly polluted with the drainage from dirty yards, outhouses, etc.

The village is now putting down a large dug well in the valley of Sunday Creek, west of the corporation, from which it is hoped to obtain a potable water.

Greenwich. Population 849. The public water supply was put in by the village in 1896, and has cost to date some $9,000, which is a per capita cost of $10.60.

The original supply was from a dug well 24 feet in diameter and 20 feet deep, located in the southern part of the village. This well soon failed to supply enough water, and it was deepened to 35 feet by excavating a smaller well within it. Finally a 6-inch well was drilled 100 feet deep, within the large well, and still the water was not sufficient.

In 1898 an impounding reservoir was constructed on a branch of Breneman Creek, southeast of the village, and the waters of this stream used to supplement the supply from the wells.

The reservoir has an area of about three acres when full, and is said to hold 15,000,000 gallons, but this estimate must be high, as a considerable portion of the above area is very shallow. The inner side of the lower embankment is paved to prevent wash, but the other sides of the reservoir have no protection, and are badly overgrown with weeds and water grasses.

It is said that the watershed above the reservoir has an area of from three to four square miles, and that it furnishes enough water, together with the well, to give the village an ample supply.

The water is pumped direct from the well and reservoir to the mains and standpipe by a horizontal compound duplex McGowan pump of 500,000 gallons capacity.

The standpipe is 11 feet in diameter by 100 feet high, and holds some 71,000 gallons.

The average pressure on the mains is 40 pounds.

There are 2.0 miles of mains in, giving some 80 percent of the people access to the water. There are 70 services in, all of which are in use, and 2 metered.

The public supply is not used for drinking purposes in the summer, private wells supplying the demand in warm weather.

Hiram. Population 659. The public water supply was put in by the village in 1897, and has cost to date some $14,000, which is a per capita cost of $21.24.

Three-fourths of a mile west of the village, in the Cuyahoga River basin, a sandstone stratum overlying a bed of shale outcrops, and several strong springs emerge from the lower edge of the former. The flow of two of these springs is collected in a covered stone cistern, and pumped from there to a standpipe, from which it flows to the village. The cistern is 30 feet in diameter, 15 feet deep and has a capacity of 75,000 gallons. The pump is a 250,000 gallon Demming, operated by a 12 horse power gasoline engine.

The standpipe is 12 feet in diameter by 100 feet high, with a capacity of 50,000 gallons, and gives an average pressure of 15 pounds on the mains.

There are three miles of mains in use, which give some 90 percent of the people access to the water. There are 75 services in, all of which are in use, but none metered. It was impossible to obtain the average daily consumption but it is quite small.

The water is in general use where available, and many more services would probably be put in were it not for the occasional shortness of the supply in the summer.

Private wells are both dug and drilled into the sandstone, which underlies the village, and seem to furnish a good water.

Jackson. Population 4672. The public water supply was put in by a private company, "The Jackson Water Company," in 1900, at a cost of about $100,000, which is a per capita cost of $21.42.

The supply is obtained from a group of eight 8-inch wells, located in the valley of a small tributary of Salt Creek, some four and one-half miles south of the city. The wells are from 103 to 150 feet deep, and go through some 20 feet of clay, then through a layer of sand in which the water is found, and finally into shale and rock.

The water from each well, is pumped by compressed air, to a small iron tank placed on a wooden tower some 28 feet above the ground. From these receiving tanks it flows by gravity to a wooden tank at the pumping station, and is pumped from there to the standpipe and mains, by two horizontal compound duplex Snider-Hughes pumps of 1,000,000 gallons capacity.

The pumping station is midway between the city and the wells, making it some two miles from the latter. The compressed air is furnished to the air lifts by an Ingersoll-Sargeant air compressor, located in this station.

The iron receiving tanks at the wells are 3.5 feet high by 2.8 feet in diameter, just large enough to allow for a free discharge of the water, and for the detention of any sand, etc. pumped from the wells.

The receiving tank at the station is 14 feet high by 14 feet in diameter, and holds some 15,000 gallons.

The water contains some iron, the quantity is decreasing however, much of which is oxydized by the time the receiving tank is reached, and the precipitate has to be cleaned out each week.

The standpipe is located on high ground, east of the station, and is 50 feet high by 30 feet in diameter, with a capacity of some 260,000 gallons.

The average pressure on the mains is 80 pounds.

There are 14.0 miles of mains in, giving some 85 percent of the people access to the water.

There are 180 services in, 177 of which are in use, and 19 of these metered.

As no records are kept, no estimate could be made of the average daily consumption.

The present supply seems to be of good quality, and its use should be encouraged in preference to the water from private wells.

It was at first proposed to use water from an abandoned coal mine, but its quality was objectionable and permission refused. A number of attempts were made to find ground water, but without success, until the present wells were located. These are scattered over an 80 acre tract of land, and will probably furnish an abundant supply, with the necessary additions as the old wells clog and the consumption increases.

The private water supply is from wells dug from 10 to 40 feet into clay, shale, etc. The water is usually of surface origin, and much of it is of poor quality.

Kent. Population 4541. The public water supply was put in by a private company, now the Kent Water and Light Company, in 1887, and has cost to date, as claimed, $200,000, a per capita cost of $44.04.

The supply is from nine 6-inch wells driven from 62 to 83 feet through sand and clay into a bed of gravel which is struck at 52 feet.

These wells are located south of the village near Plum Creek, the waters of which are also used in case of fire or other emergency. The run-off of the creek is impounded in an earthen reservoir of some three or four million gallons capacity. This reservoir was the original supply, the first wells being put in in 1895, and others added in 1898.

The water is pumped from the wells to a standpipe by two horizontal compound duplex Holly pumps of 1,000,000 gallons capacity each.

The normal level of the water in the wells is very near the surface, and it is lowered nearly to the suction point by the maximum consumption.

The standpipe is 14 feet in diameter, 100 feet high, giving a capacity of 115,000 gallons. The average domestic pressure is about 80 pounds.

There are 8.5 miles of mains in, giving some 80 percent of the people access to the water.

There are 524 services in, of which 449 are in use and 63 of these metered.

The average daily consumption is 818,000 gallons, which is 1822 gallons per service, 180 gallons per capita, and 364 gallons per consumer.

The water is in general use for domestic purposes by those having access to it, but there is some dissatisfaction from the fear that the Plum Creek water is used at times.

Private wells are usually drilled into the rock which is very near the surface in a large portion of the village.

Lakeside. Population 1000. This is a summer resort with a population of about 350 from October to May, but from 1000 to 3000 from May to October. It is estimated that the average population is 1000.

The public water supply was put in by the company conducting the resort, in 1898, and has cost to date $5,958, which is a per capita cost of $5.96.

The supply is obtained from Lake Erie at a point just east of the settlement and 250 feet from the shore. The water is pumped from here to four gravity filters by a horizontal duplex Hughes pump of 250,000 gallons capacity. The filters are located on high ground back of the village and supply the water by gravity after filtering same.

The filters consist of four wooden tanks, each 8 feet high with the following diameters, respectively, 12, 13½, 14 and 14 feet. This gives a combined area of 564 square feet and a capacity of 33.000 gallons at the standard rate for slow sand filters. For a little additional pressure the filters are elevated on 12-foot wooden trestles. Each filter contains 4 inches of coarse gravel, 8 inches of fine gravel, and on top of this 3 feet of fine lake sand. The gravel rests on a false bottom of 2x4's laid flat on 2x4 stringers, the former notched to allow a free passage of the water. The rate of filtration is controlled by a floating outlet, so arranged, as to maintain a uniform rate independent of the loss of head in the filter. The effluent water passes to a receiving tank of 3,900 gallons capacity, placed on about the same level with the filters. The filters seem to be doing good work, and no doubt furnish a potable water.

The average turbidity of the lake water is such that the filters have to be cleaned every four days, or rather one filter each day.

The average pressure on the mains is 50 pounds.

There are 3.5 miles of mains in, giving every one in the resort access to the water. Most of these mains are laid on the surface and are so arranged that they can be completely drained. This causes no inconvenience as the plant is in operation from May to October only, the summer season.

There are 350 services in, all of which are in use, for more or less of the season, but none of them metered.

It was impossible to estimate the average daily consumption but it is not large, as the water is used for domestic purposes only. But at times, however, on special days, the consumption is up to the maximum capacity of the filters. During the closed season, the water supply is obtained from private wells which are not in use in the summer.

Leetonia. Population 2744. The public water supply was put in by the village in 1889, and has cost to date $53,000, which is a per capita cost of $19.50.

Bonds for $6,000 have been issued for the obtaining of an additional supply of water, and this amount will soon have to be added to the total cost.

The original supply was from twelve springs, or rather shallow wells, located in the valley of Cherry Fork, just east of the village. The wells are dug along the lower edge of a ledge of gravel which is underlaid with blue clay, and the water thus held close to the surface. The wells are 3 feet in diameter, 7 feet deep, are lined with brick and each covered with a stone slab. The water is led through tile pipes to a 10,000 gallon brick collecting well, from which it flows by gravity to the pump well at the station, some third of a mile west.

In the dry part of the year these springs failed to supply enough water, and in 1894 a filter was put in to handle the water of Cherry Fork.

This filter contains two beds, each 23½ feet by 58 feet, containing 3 feet of sand. The filter beds are contained in substantial open brick basins, but do not seem to be properly underdrained or provided with means for regulating the head or rate of filtration. The filters were not a success as operated, and a great deal of complaint seems to have been made when the creek water was used. During the past few years the filter was used only when necessary.

In the early part of 1900, four more shallow wells were put down near the old ones and some additional water secured, but not enough to make up the deficiency.

In the same year three wells were drilled in the small valley nearly a mile south of the station, and it is believed sufficient water has been found here to help out the old wells. These new wells are 8 inches in diameter and from 52 to 58 feet in soil, clay, slate and sandstone, and down to shale. Six thousand dollars has been secured to bring this water to the present pumping station.

The receiving well is an open brick cistern, 30 feet in diameter and 20 feet deep, with a capacity of something over 100,000 gallons.

From this the water is pumped to a supply reservoir by two horizontal compound duplex Gordon pumps of 500,000 gallons capacity each.

The reservoir is a covered brick basin about 72 feet in diameter and 17 feet deep, with a capacity of 500,000 gallons. The average pressure on the mains is 50 pounds.

Ther are 8.0 miles of mains in, which are accessible to some 90 percent of the population.

There are 360 services in, of which 348 are in use, and 5 of these metered.

The average daily consumption is 117,000 gallons, which is 336 gallons per service, 43 per capita, and 67 gallons per consumer. The springs are good for nearly the average amount, but fail the worst during the summer and fall when the consumption is large and their supply the lowest.

The hydrant water is in general use where available, and its use would increase if a reliable and potable supply were assured.

Private wells are only 8 to 15 feet deep, dug in the sand and gravel, and can furnish but a poor water in the built up portions of the village.

There are some 30 water closets in use, 20 of which drain to the few short sewers leading to the creek, and the remaining 10 are sewered to cesspools.

The ground water is being badly polluted by the practice of covering over vaults instead of cleaning them out.

Leipsic. Population 1726. The public water supply was put in by the village in 1901 at a cost of $27,000, which is a per capita cost of $15.64.

The supply is obtained from four 6-inch wells and one 8-inch well, all located in the western part of the village. The wells are drilled through 83 to 85 feet of drift, and from 51 to 53 feet into the limestone rock. The well site is low and swampy, but it is not believed that the rock water reached is seriously affected by surface conditions.

Two of the wells are pumped to an elevated tank by Gould deep-well power pumps of 50,000 gallons capacity each. The pumps are actuated by electric motors supplied with power from a central station. It is the intention, it is claimed, to put in a receiving basin for the deep-well pumps, and to rehandle the water from the latter by a large horizontal duplex pump.

The tank is 18 feet in diameter by 23 feet high, with a capacity of 40,000 gallons, and it is placed on a 92-foot tower, making a total height of 115 feet. The average pressure on the mains is 45 pounds.

There are 5.0 miles of mains in, giving some 90 percent of the people access to the water. As yet there are but 25 services in, all of which are in use and none metered.

Owing to the newness of the plant,, private wells still supply practically all the water used for domestic purposes.

Logan. Population 3480. The public water supply was put in by the village in 1895 and has cost to date $39,200, which is a per capita cost of $11.27.

The supply is obtained from a large dug well, 25 feet in diameter and 26 feet deep, located in the gravel bottom land near the Hocking River, just south of the village.

This well is walled up with brick laid in cement, so that all the water must enter from the bottom. It is housed over to protect from the sun, dust, etc. The normal level of the water is from 7 to 18 feet from the surface, depending on the season and stage of river. In the summer and fall it is lowered to within a foot or so of the bottom by the heavy consumption during sprinkling hours.

The level of the water varies with the river, indicating that it is the subsurface flow of that stream that is utilized.

The water is pumped direct to the mains by two horizontal compound duplex Worthington pumps of 1,000,000 gallons capacity each. The average pressure on the mains is 65 pounds.

Owing to the heavy draft on the wells during the summer evenings, and to the lack of any storage capacity to equalize the pumping, the well all but fails, and it is proposed to put in a number of driven wells to increase the supply.

There are 8.5 miles of mains in, giving some 85 percent of the people access to the water.

There are 280 services in, 275 of which are in use, and none metered.

The average daily consumption is estimated at 190,000 gallons, which is 691 gallons per service, 138 per consumer, and 55 gallons per capita of the total population.

The public supply is in general use where available and is no doubt an excellent water. The same water is reached in most of the private wells, but owing to the proximity of vaults, etc., it may not be of such good quality in these developments.

Marysville. Population 3048. The public water supply was put in by a private company, the Marysville Light & Water Company, in 1898, and has cost to date about $85,000, which is a per capita cost of $27.89.

The original supply was from six 6-inch wells 85 feet deep, with Mill Creek as a reserve supply, but these sources have been abandoned and the entire supply has been, for two years, secured from one 8-inch well 145 feet deep.

The normal level of the water in this well is 10 feet below the surface, and pumping at the rate of 1,500,000 gallons per twenty-four hours, failed to lower the water more than 10 feet.

Both the old and new wells are located near Mill Creek in the northern part of the city. The water is pumped direct from the well to the mains by two horizontal compound duplex Hughes pumps of 750,000 gallons capacity each.

The average domestic pressure maintained is 60 pounds.

There are 8.0 miles of mains in, giving some 80 percent of the people access to the water. There are 425 services in, of which 422 are in use, and only 1 metered.

The average daily consumption is 650,000 gallons which is 1530 gallons per service, 306 gallons per consumer and 213 gallons per capita of the village.

The hydrant water is being used wherever available, to the gradual abandonment of private wells.

However, there are still in use a number of shallow wells dug into the first gravel, and a few deeper ones driven to lower strata.

Medina. Population 2232. The first public water supply was put in by the village in 1886, but this plant gradually run down, the supply of water failed, and the plant was abandoned.

In 1898 nearly an entire new water-works was put in by the village at a cost of $8,000, which is a per capita cost of $3.58.

The present supply is obtained from two 8-inch wells drilled 100 feet deep into a grayish black shale. A 100,000 gallon Smith-Vaile and a 50,000 gallon McGowan deep-well pump force the water from these wells direct to the mains and standpipe. The McGowan pump is out of repair and is little used.

The one well is not able to furnish enough water, and the local electric light plant pumps from their 100-foot well, to the mains for a number of hours each day. The wells, including the one at the electric light plant, are in the southeastern part of the village.

The standpipe is 14 feet in diameter and 90 feet high, with a capacity of 100,000 gallons, and furnishes an average pressure of 40 pounds on the mains.

There is only 1 mile of mains in, giving some 20 percent of the people access to the water.

There are 68 services in, 60 of which are in use and 3 of these metered.

The average daily consumption is 15,000 gallons, which is 250 gallons per service, 50 per consumer and 7 per capita of the total population.

The water is used but little for domestic service, and the system seems to have been put in for fire protection only.

The private water supply is from wells dug from 8 to 15 feet into the shale.

Milan. Population 653. The public water supply was put in by the village in 1888, and has cost to date some $12,000, which is a per capita cost of $18.38.

The supply is obtained from a large basin dug into a gravel bed located in the southern part of the village. The excavation is about 80 by

130 feet by 18 feet deep, with sides paved with stones on a slope of 1 to 1, and the bottom composed of the natural gravel. This basin merely collects the ground water of the vicinity and acts as a large well.

At times this supply has run short and a small impounding reservoir, just north of the plant, has been drawn on. This reservoir receives the run-off from a small portion of the village, and from a larger area of farm land outside of the corporation. It is also used to some extent as an ice pond, but its waters seem hardly satisfactory to use for either purpose.

When necessary the water is pumped from this second reservoir to the first, or original, by a small Hughes duplex pump of 50,000 gallons capacity.

From the latter all the supply is pumped direct to the mains by a horizontal compound duplex Hughes pump of 1,000,000 gallons capacity. The average pressure maintained is 40 pounds.

As the water is not in general use for domestic and household purposes, and for economy's sake, the pressure is only maintained for 14 hours per day.

There are 2.2 miles of mains in, giving some 75 percent of the people access to the water. There are 47 services in, all of which are in use, and none metered.

The average daily consumption for the past year has been 19,000 gallons, which is 401 gallons per service, 80 per consumer, and 29 gallons for each inhabitant of the village. The entire supply of drinking water seems to be obtained from shallow dug wells.

Milford Center. Population 682. The public water supply and electric light plant were put in by the village in 1894 and have cost to date some $15,000, which is a per capita cost of $21.99. Probably about two-thirds of the above amount is for the water-works, but no accurate figures could be secured.

The supply is obtained from a well, dug on the bank of Big Darby Creek, in the northern part of the village, obtaining its water from the gravel of the creek bed. The well is 8 feet in diameter and 20 feet deep. It is boarded up and has a brick arch over the top to keep out flood water if it should reach the top — a thing which has not yet happened.

When not pumping, the water in the wells stands even with the creek, but the level drops quickly with the starting of the pumps and rises again on their stopping.

The water is pumped direct from the well to the mains by two horizontal duplex McGowan pumps of 500,000 gallons capacity each. The average pressure maintained is 35 pounds. For emergencies there is a direct 6-inch connection to the creek, which, however, has not been used for a year at least.

Ther are 1.8 miles of mains in, which are accessible to some 90 percent of the people.

There are 99 services in, of which 87 are in use and none of these metered.

It was impossible to even estimate the consumption.

Mingo Junction Population 2954. The public water supply was put in by a private company, "The Mingo Junction Water Company," in 1899, and has cost to date about $40,000, which is a per capita cost of $13.88.

The supply is obtained from a filtering crib sunk in the gravel bed of the Ohio River. The crib is 48 feet long, 8 feet wide and 4 feet deep, and is connected to the pumps by a 10-inch suction line.

The pump is a Demming triplex power pump of 500,000 gallons capacity, operated by the steam engine which is used on the lighting system at night. This pump is placed in a 35-foot well, so as to bring the water within the suction limit.

The water is pumped to an open brick reservoir, 60 feet in diameter and 20 feet deep with a capacity of 400,000 gallons.

The pressure on the mains varies from 60 to 120 pounds with 100 as the average.

There are 2.5 miles of mains in, giving some 90 percent of the people access to the mains.

There are 300 services in, all of which are in use, but none metered.

It was impossible to estimate the average daily consumption. About 50 percent of the people still use water from private wells. These are both dug and driven into the river gravel, with a number drilled into the rock.

Mt. Sterling. Population 986. The public water supply was put in by the village in 1896, and has cost to date about $12,000, which is a per capita cost of $12.17. An electric light plant is operated in connection with the water-works, the cost of which was likewise about $12,000.

The supply is from an 8-inch well 145 feet deep, 76 feet of which is in the drift and the remainder in limestone. The water stands within 36 feet of the surface and has as yet been lowered but little by the pumping. The water is pumped to a receiving well by a McGowan deep-well pump of 150,000 gallons capacity, and from the receiving well direct to the mains by two horizontal duplex McGowan pumps of 500,000 gallons capacity each.

The pump well consists of a covered brick cistern 30 feet in diameter and 21 feet deep with a capacity of 110,000 gallons. The average domestic pressure maintained is 45 pounds.

There are three miles of mains in, giving some 95 percent of the people access to the water. There are 124 services in, all of which are in use, and none metered. The average daily consumption is 150,000 gallons, which is 1210 gallons per service, 152 per capita and 240 gallons per consumer.

The well is located in the northeastern part of the village in a district comparatively free from local pollution, so that it should be able to supply a good quality of water.

The few private wells in use obtain their water from both dug and driven wells which vary in depth from 20 to 100 feet.

New Richmond. Population 1916. The public water supply was put in by the village in 1899 and has cost to date, together with the light plant, some $35,000, which is a per capita cost for both of $18.27.

The water is pumped direct from the Ohio River by a vertical duplex Rumsey power pump of 250,000 gallons capacity, which is operated by a 120 horse power Brown-Corliss engine. The intake pipe is 10 inches in diameter and extends 200 feet from mean low water, into the river, and also extends back 300 feet, through a tunnel, to the pump well at the station.

The pump discharges into an open brick reservoir, 100 feet in diameter, 10 feet deep, and with a capacity of 700,000 gallons. It is placed on a hill back from the river where it gives an average pressure of some 80 pounds.

There are 4.7 miles of mains in, giving some 90 percent of the people access to the water. There are 38 services in, all of which are in use and 6 of these metered.

From May to November there are 50 services in use, and for the remainder of the year only 25, as there are 25 for sprinkling only.

The average daily consumption is 30,000 gallons, which is 789 for the average number of services in use, 158 gallons per consumer and 16 gallons per capita of the village.

While the river water is used to some extent for domestic purposes, the main supply for this purpose is from cisterns and from a few private wells, both dug and driven to the gravel at the river level.

The well supply is especially liable to pollution as it is customary to dig vaults about 40 feet deep so that they will drain to this same bed of gravel at the river level and so fill up very slowly.

North Baltimore. Population 3561. The public water supply was put in by a private company, "The North Baltimore Water & Electric Company," in 1892, and has cost to date some $58,000, which is a per capita cost of $16.28.

The supply is obtained from nine 6-inch wells, located in the southern part of the village near the Portage River. The wells are drilled some 125 feet deep, going through 20 feet of clay and gravel, then striking the limestone in which the water is found.

Four of the wells are pumped to an open reservoir by air lifts supplied from a Stillwell-Bierce compressor, and all are connected with the pumps by direct suction lines. The air lifts supply all the water for a greater part of the time as the water level is too low for the pumps.

The reservoir is merely a basin excavated in the gravel and clay, and the sides are not paved or protected in any way. Surface drainage is excluded by suitable embankments. This basin holds some 400,000 gallons and serves as a pump well, also holding a reserve supply for fire or other emergency.

The water is pumped from this to a standpipe by two horizontal compound duplex Laidlaw-Dunn-Gordon pumps of 1,000,000 gallons capacity each.

The standpipe is 110 feet high, 16 feet in diameter, and holds some 165,000 gallons. The average domestic pressure on the mains is about 50 pounds.

There are 12.0 miles of mains in, giving some 90 percent of the people access to the water. There are 300 services in, 250 of which are in use, and 25 of these metered.

It was impossible to estimate the average daily consumption as no records are kept.

The public supply seems to be of good quality and is in general use where available.

The private supply is from a large number of shallow dug wells, and from a few deeper drilled ones.

Plain City. Population 1432. The public water supply was put in by the village in 1894 and has cost to date, together with the electric light plant, some $45,000, which is a per capita cost for both of $31.42.

The supply is obtained from two 8-inch wells located in the eastern part of the village. These wells were drilled 1700 and 2200 feet deep respectively in an attempt to find oil. Such a good flow of water was obtained that the wells were secured for a public supply.

The mineral waters of the lower depths were cut off by plugging the wells at 365 feet, which is the present depth. When not pumping the water flows at an elevation of 11 feet above the surface, and the level is rarely lowered below the surface except in times of especially heavy consumption.

The water is pumped direct to the mains by two horizontal compound duplex McGowan pumps of 1,000,000 gallons capacity each. The average pressure maintained on the mains is 40 pounds.

There are 6.0 miles of mains in, giving some 75 percent of the people access to the water. There are 340 services in, 300 of which are in use and 1 of these metered.

It was impossible to estimate the average daily consumption.

Pomeroy. Population 4639. *Middleport*. Population 2799. The public water supply was put in by a private company, "The Pomeroy and Middleport Water Company," in 1899. It has cost to date about $42,000, which is a per capita cost of $5.65.

The supply is obtained direct from the Ohio River at a point opposite the upper end of Pomeroy. The water from the river at this point is representative of the stream, as the nearest serious sewage pollution is Parkersburg, some 59 miles above.

A 10-inch intake extends 150 feet into the river, through which the water is drawn by a 500,000 gallon horizontal duplex Buffalo pump, and forced into a settling basin located on the hillside above the pumping station. The pump is placed in an 18-foot well 48 feet deep, the bottom being about 13 feet above extreme low water.

The settling basin consists of a steel tank 35 feet high by 35 feet in diameter, with a capacity of 235,000 gallons. It is placed so as to be about 100 feet above the bottom of the pump well and to give a head of 56 feet on the filter.

The water is admitted to this basin at the bottom, and drawn off from one foot below the surface of the water by a floating pipe.

The water from this basin is conducted to a horizontal pressure filter the effluent from which is pumped to the supply reservoir by a horizontal compound duplex Buffalo pump of 500,000 gallons capacity. The filter was manufactured by Robt. Wetherill & Co., of Chester, Pa., and consists of a steel tank 25 feet long by 8 feet in diameter. This tank rests on its side, and contains a bottom layer of 2 feet of concrete, above which is 4 feet of sand. The effluent is collected by means of ten 2½-inch brass pipes running through the filter just above the concrete filling. These pipes are perforated and surrounded with a brass screen so as to allow a free passage for the water and still hold back the sand.

The filter area claimed is 120 square feet, but it will be larger than this if much sand is wasted in washing without replacing.

The capacity of the filter is stated to be 500,000 gallons per 24 hours, which with the above area will give a rate of more than 180,000,000 gallons per acre per day.

As the average daily consumption for the past year was only 85,000 gallons, the actual rate of filtration was only a little more than one-fifth of the above named figure.

The filter bed is cleaned by causing a reverse current of clean water to flow through it, the supply from the settling basin having previously been shut off and a waste valve opened.

The washing is not supplemented with any mechanical stirring, everything being left to the stirring action of the heavy pressure of water. This method carries a considerable quantity of sand over into the waste pipe, requiring the sand bed to be restored at rather short intervals, if the original depth is to be maintained.

The filter is supposed to be operated with a coagulant, sulphate of aluminum in this case, but when the river water is in a fair condition, it is claimed that no alum is needed to secure a clear effluent.

In six months, from January 1st to July 1st, only 4000 pounds of alum were used, or an average of 1.5 grains per gallon of the water filtered during this period. It was not used in this way, however, as the water at times would require two and three grains per gallon, and at others none at all. It was stated that for the above period the water was exceptionally turbid and an unusual amount of alum required, also that much less was expected to be used during the summer and fall, the seasons of low water.

The alum is mixed in a small iron tank, and fed to the water as it passes to the settling basin, by a small pump actuated by the large pump which takes the effluent from the filter.

As the suction of this pump is attached direct to the effluent pipe of the filter. The rate of filtration is of necessity the same as the discharge of the pump. The amount of alum used per gallon is varied by varying the strength of the solution, and by changing the stroke of the alum pump.

The methods in use do not permit accurate estimates to be made on the quantity of coagulant used.

The filter has to be cleaned from once a week to once a day, depending on the turbidity of the river.

The supply reservoir is an open brick basin 65 feet in diameter and 13 feet deep with a capacity of 275,000 gallons. At times there have been objectionable growths in the reservoir and it is the intention to have it covered.

The average pressure on the mains is about 95 pounds.

In Pomeroy there are 7.0 miles of mains, giving some 75 percent of the people access to the water. To these mains 173 taps have been made, 170 of which are now in use and all of these metered.

In Middleport there are 4.5 miles of mains, giving some 75 percent of the population access to the water. Here there are 71 services, 69 of which are in use and all metered.

The average daily consumption for both places is 85,000 gallons, which is 455 gallons per service, 91 gallons per consumer and 11 per capita of the village.

The private supply is from a few wells but mostly from cisterns.

Reading. Population 3076. The public water supply was put in by the village in 1892. With it there was installed an electric light plant, and the combined cost of the two was $50,000, which is a per capita cost of $16.25.

The supply is obtained from three 8-inch wells drilled some 150 feet deep through various strata of clay, sand and gravel and into a very coarse gravel, in which the water is found. The wells are in the northern part of the village where the surface is only reasonably free from pollution. The depth at which the water is found no doubt prevents the same from being influenced by surface conditions.

The water is pumped from the wells to a receiving basin by three Bradford deep-well pumps each of about 100,000 gallons capacity in twenty-four hours. The water comes to within 12 to 20 feet of the surface, depending on the season, and it is lowered but little by the maximum consumption. The receiving basin is a covered brick cistern 24 feet in diameter and 16 feet deep, with a capacity of 50,000 gallons. From this the water is pumped to a distributing reservoir by a horizontal duplex Laidlaw-Dunn-Gordon pump of 1,000,000 gallons capacity.

The reservoir is an open brick basin, 10 feet deep and about 65 feet in diameter, with a capacity of about 1,000,000 gallons. It is situated on a hill east of the village, and at such an elevation as to give an average pressure of some 80 pounds on the mains.

There are 6.0 miles of mains in, giving about 75 percent of the people access to the water. There are 60 services in, all of which are in use, but only 18 metered.

There is no record kept of the daily consumption.

The water is used for domestic purposes, where available, but there are still a large number depending upon private wells.

Rockford. Population 1207. The public water supply was put in by the village in 1897 and has cost to date some $17,000, which is a per capita cost of $14.08.

A private company owns and operates an electric light plant in the water-works pumping station and obtains its power from the water-works boilers. This arrangement, it is said, pays the water-works enough annually to pump the entire supply for the village.

The supply is obtained from two 6-inch wells, drilled 109 and 111 feet respectively, into an extensive bed of gravel.

The normal level of the water is from 11 to 16 feet from the surface, and it is lowered but little in one, and some 50 feet in the other by ordinary pumping.

These wells are pumped by two Laidlaw-Dunn-Gordon deep-well pumps of 150,000 gallons capacity each, which discharge into a receiving well, from which the water is pumped to a standpipe by a horizontal compound duplex Laidlaw-Dunn-Gordon pump of 500,000 gallons capacity.

The receiving well is 24 feet in diameter, 14 feet deep, with a capacity of 50,000 gallons, and is constructed of brick and covered with a tin roof, The standpipe is 107 feet high, 12 feet in diameter, with a capacity of 94,000 gallons, and furnishes an average pressure on the mains of 40 pounds.

There are 2.0 miles of mains in, which give some 90 percent of the people access to the water. There are 52 services in, all of which are in use and 10 metered.

The average daily consumption is about 23,000 gallons, which is 442 per service, 38 per consumer and 19 per capita of the village's population.

The wells are located in the northwestern part of the village, away from any serious local pollution, and the water seems to be of good quality.

There are quite a number of private wells still in use. These are usually dug about 35 feet deep, going through clay and hard-pan into the gravel below.

Sabina. Population 1481. This village put in a combined waterworks and light plant in 1898 at a cost of $30,000, of which some $18,000 was for the water supply, which is a per capita cost of $12.15.

The supply is obtained from two 6-inch wells and two 4-inch wells, drilled from 125 to 150 feet, through soil, quicksand and hardpan into the rock below. The water is found in the rock and it rises to within 15 feet of the surface, and is lowered some 15 feet by pumping.

The water is pumped direct from the wells to a standpipe by two horizontal compound duplex Smith-Vaile & Stillwell-Bierce pumps of 500,000 gallons capacity each. The standpipe is 12 feet in diameter, 115 feet high and has a capacity of 97,000 gallons. The average domestic pressure is 50 pounds.

There are 4.0 miles of mains in, to which some 80 percent of the people have access. There are 100 services in, of which 98 are in use, but none metered.

The average daily consumption is 30,000 gallons, which is 306 gallons per service, 61 gallons per consumer, and 20 gallons per capita of the total population.

The wells are located in the northeastern part of the village, removed from local pollution, and the water is of good quality. It is not, however, used as much as it should be in summer, as it becomes quite warm in the standpipe.

Private wells are usually drilled from 60 to 100 feet deep and obtain their water in or just above the rock. A few are dug some 20 feet in the hardpan, but furnish little water.

There are two water-closets supplied with village water, both of which drain to cesspools. Shallow pits and boxes are the general rule, with a few deep vaults; all must be cleaned.

The surface drainage of the village, also the drainage from a creamery and canning factory, goes to a small branch of Lees Creek.

St. Bernard. Population 3384. *Bond Hill.* Population 1081. The public water supply for these villages was put in by St. Bernard in 1895. The works complete, including a light plant, but not the Bond Hill mains, cost to date $90,000, which is a per capita cost of $26.60. The mains, etc. for Bond Hill cost $17,000, a per capita cost of $15.72, and were put in by that village. Bond Hill pays 6 cents per 1000 gallons for at least 50,000 gallons per day and for any excess that is used.

The supply is from four 8-inch wells, drilled 130 feet deep through the soil, clay and a thick stratum of sand down to the rock. The normal level of the water is 24 feet from the surface, but it is lowered to 50 feet by ordinary pumping. Deep-well pumps on two of the wells supply all of the water necessary except when the wells get low in the summer and fall, when air lifts on the two remaining wells are used.

The deep well pumps are of the Laidlaw-Dunn-Gordon make with a capacity of 175,000 gallons per day each. The water is pumped from the deep wells to a receiving well from which it is pumped to a standpipe by two horizontal compound duplex Laidlaw-Dunn-Gordon pumps of 1,000,000 gallons capacity each.

The standpipe consists of a 20-foot tank, 115 feet deep, holding 270,000 gallons, placed on a 11-foot masonry base, giving a total height of 126 feet and an average pressure on the mains of 70 pounds. The receiving well consists of a covered brick cistern 20 feet in diameter and 16 feet deep, with a capacity of 37,000 gallons.

There are 8.0 miles of mains in St. Bernard, giving some 90 percent of the village access to the water. In this same place there are 213 services, 210 of which are in use and 85 of these metered.

Bond Hill has 4.0 miles of mains which are accessible to some 90 per cent of the people. It has 62 services, 46 of which are in use and all metered.

The average daily consumption for both places is 196,800 gallons, which is 769 gallons per service, 154 per consumer and 44 gallons per capita of the combined populations.

The wells are in the central part of St. Bernard, but on account of the thick stratum of clay above the water-bearing sand, the local pollution can probably have but little influence upon the water.

Salineville. Population 2353. The public water supply was put in by the village in 1892, and has cost to date some $45,000, which is a per capita cost of $19.12.

The original supply was from some eight wells drilled from 50 to 90 feet deep into the sandstone, found just below the surface in the valley of Yellow Creek, above the village.

These wells soon failed to supply enough water, and a 12-foot well was dug some 49 feet into the same strata, and the drilled wells connected to same.

This combined supply also began to run short and an earthen dam was thrown up in Yellow Creek and a part of the flow from this stream diverted to the dug well to help out in times of excessive consumption.

As this use of the surface water increased from time to time a second large well was dug in the same valley, but some three-quarters of a mile above the old wells. This new well is 22 feet in diameter, 30 feet deep and seems to be able to furnish considerable water. The connecting line has not been laid yet but it is proposed to put it in at once, after which it is believed that the use of the surface water may be abandoned.

The emergency intake is above all pollution from Salineville and the water should be of fair quality for the run-off of such a small stream, but its use should be abandoned as soon as the ground water supply is sufficiently developed.

The water is pumped direct from the large well to a reservoir by two horizontal compound duplex Hughes pumps of 700,000 gallons capacity each. The reservoir, located on a hill above the pumping station, is 62 feet in diameter by 16 feet deep and holds some 360,000 gallons.

The pressure at the station is 110 pounds and it is estimated that the average over town is 100 pounds, though at some points it is much higher.

There are some 8.0 miles of mains in, giving about 90 percent of the population access to the water. There are 275 services in, 225 of which are in use, and 10 of these metered.

The average daily consumption is 250,000 gallons, which is 1100 gallons per service, 220 per consumer and 106 per capita of the village's population.

There are a number of private wells in use, some of the deeper of which ought to furnish a fair water.

Union City. Population 3998. This is in reality two villages, one on each side of the Ohio-Indiana state line. The Indiana side has practically all the business and some 2716 of the people.

The public water supply was put in by the Indiana side in 1873, and has cost to date some $100,000. The Ohio side put in mains and is supplied at the same rate as the residents of Indiana. The per capita cost of construction is $25.01.

The original supply was from the dug wells, which are about 30 feet in diameter and 29 and 34 feet deep respectively. Later these were supplemented by two 8-inch wells drilled some 160 feet through the drift and into the limestone below. The normal level of the water is from 8 to 12 feet below the surface, and it is rather easily lowered, by pumping, to about 25 feet.

The water is pumped direct to the mains at an average pressure of 35 pounds.

There are 17.0 miles of mains in, 6 of which are in Ohio, to which it is estimated that some 80 percent of the total population has access.

There are 665 services in, all of which are in use, and 37 of these metered. In Ohio there are 65 services, only 2 of which are metered.

The water is pumped direct from the wells by a horizontal duplex Deane pump of 1,000,000 gallons capacity, and by a horizontal duplex Laidlaw-Dunn-Gordon pump of 1,000,000 gallons capacity.

The average daily consumption is about 266,000 gallons, which is 400 gallons per service, 80 per consumer and 67 per capita of the village.

It will be interesting to note that there are some four and three-quarter miles of wooden mains still in use.

Washington C. H. Population 5751. The water-works for this village was put in by a private company, the Washington Water Company, in 1889, and has cost to date some $170,000, which is a per capita cost of $29.56.

The supply is obtained from a large number of wells, both dug and drilled, in the low lands bordering Paint Creek, northwest of the village. There are at present in use, two 6-inch wells 150 feet and 170 feet deep, one dug well 20 feet in diameter and 45 feet deep, one dug well 30 feet in diameter and 45 feet deep, and eight dug wells 8 to 12 feet in diameter and from 40 to 50 feet deep. Rock is found at a depth of from 40 to 50 feet and all the shallow wells go down through gravel to this rock, the deeper ones being in the rock. The first supply was from the large wells, but these soon failed to supply enough water, and the others were dug to help out. The deep ones were put down in 1890, and some of the others since that time.

The 8-inch well is pumped by a deep-well pump to one of the large covered wells, from which in turn the water is pumped direct to the standpipe by a small horizontal duplex Smith-Vaile pump of 500,000 gallons capacity. The water from the small dug wells is pumped direct to the standpipe by two horizontal compound duplex Worthington pumps of 1,500,000 gallons capacity.

The standpipe is located at the works and is 25 feet in diameter, 125 feet high, and has a capacity of 293,000 gallons. The average domestic pressure is 45 pounds.

There are 17.0 miles of mains in, to which it is estimated that some 90 percent of the people have access. There are 560 services in, of which 507 are in use and 483 of these metered. It was impossible to obtain a reliable figure on the average daily consumption.

At times during the past few years the supply has been short, especially during years of low rainfall, and it is probable that the well system will have to be extended if there is any appreciable increase in the consumption.

A more systematic method of pumping the present wells would no doubt also help matters.

The hydrant water is in general use when available, but there are still quite a number of private wells in use. These are from 26 to 30 feet deep in sand and gravel.

Wellington. Population 2094. The public water supply was put in by the village in 1898, and has cost to date, together with the light plant, about $35,000, which is a per capita cost of $16.71.

The works were installed in connection with the electric light plant, and the water is to be used for fire protection and general use, but not for domestic use at all. Its use for this latter purpose is prohibited by an ordinance, passed by order of the State Board of Health.

The supply is from an impounding reservoir on a small run draining a small area of farm land. The reservoir has an area of about 1¼ acres, an average depth of 10 feet and holds some 3,000,000 gallons of water. The sides are not paved and the water is turbid all the time.

The water is pumped direct from this to a standpipe by a horizontal duplex Snider-Hughes pump of 1,000,000 gallons capacity.

The standpipe is 12 feet in diameter, 110 feet high, with a capacity of 93,000 gallons, and furnishes a pressure of some 50 pounds on the mains.

There are 4.5 miles of mains in, accessible to 80 percent of the people.

There are 15 services in, all of which are in use and all metered.

The average daily consumption is 20,000 gallons, which is 1330 gallons per service, 266 per consumer and 10 per capita of the total population. The large consumption is due to the use of water by the railroads.

The water for domestic use is obtained almost entirely from cisterns.

Wyoming. Population 1450. From the water-works of this village there are supplied in addition the villages of Hartwell, Lockland and Arlington Heights; but as each of these places owns and controls its own distribution system they will be taken up separately, and under Wyoming there will be given only a description of the plant of the village proper.

The water supply for Wyoming was put in by the village in 1892, and has cost to date some $50,000, which is a per capita cost of $34.48.

The supply is obtained from four 8-inch wells, drilled from 140 to 200 feet deep into the drift of Mill Creek Valley, the deepest wells just reaching the bed-rock.

The usual level of the water is 45 feet from the surface and it is lowered some 5 feet by the ordinary consumption.

Originally all the wells were pumped by deep-well pumps, but now all these but one have been displaced by air lifts operated by a Laidlaw-Dunn-Gordon compressor.

The deep-well pump still in use was made by the same company and has a capacity of about 100,000 gallons per day. This pump, together with the air lifts, discharge the water to a covered receiving basin 20 feet in diameter and 15 feet deep, with a capacity of 34,000 gallons. From this the water is pumped to a distributing reservoir by a horizontal compound duplex Laidlaw-Dunn-Gordon pump of 1,000,000 gallons capacity.

The distributing reservoir is located on the high ground in the western part of the village, and at such an elevation as to give an average pressure on the mains of 100 pounds.

The reservoir has an area of about 0.7 of an acre with an available depth of 13½ feet, giving a capacity of 3,000,000 gallons.

In Wyoming there are 9 miles of mains, giving some 90 percent of the people access to the water. There are 200 services in, all of which are in use and all metered.

The average daily consumption for the plant is 218,000 gallons, 120,000 gallons of which are used in Wyoming. This is an average daily consumption per service of 600 gallons, 120 gallons per consumer and 82 gallons per capita of the village population.

There are but few private wells in use, and these are usually shallow dug ones.

Hartwell. Population 1833. This village has had a public water supply since 1893. The water is now secured from the village of

TABLE II—DESCRIPTION OF PUBLIC WATER SUPPLIES

Number.	Name of Town.	Population	Ownership of Plant	Date of Installation	Cost to Date	Cost to Date per Capita of Population	Source of Supply	Method of Supplying Water	Capacity of Reservoir or Standpipe (in gallons)	Average Pressure on Mains	Miles of Mains	Percent of Population Accessible to Mains	Number of Services in	Number of Services in use.	Numbers of Meters in use	Pumps	Total Pumping Capacity in Gallons per 24 Hours.	Average Daily Consumption in Gallons.	Average Daily Consumption per Service.	Average Daily Consumption per Consumer.	Average Daily Consumption per Capita.	Remarks.
1	Athens	3,066	Village	1891	45,000	14.67	1 dug well, 23 ft. deep, 30 ft. dia	Pumping to standpipe.	95,000	70	4.5	95	600	575	150	2 Hor. comp dup Gordon, 1,500,000 gals. each	3,000,000	260,000	452	90	85	
2	Berea	2,510	Village	1900	30,000	11.95	Stone quarry and East Fork Rocky River	Pumping direct		50	5.5	50	53	53	36	1 Hor comp dup Snider-Hughes, 750,000 gals	750,000	Not obtainable				Combined water & light plant cost $42,000
3	Bowling Green	5,067	Private	1893	75,000	14.80	8 6-in wells, 213-240 ft deep. 1 9-in. well, 213 ft. deep.	Pumping to standpipe	Res., 1,062,000, standpipe, 165,000	45	7.0	75	540	485	1	2 Hor comp dup Laidlaw-Dunn-Gordon, 1,000,000 gals each	2,000,000	Not obtainable				
4	Cadiz	1,755	Village	1895	43,000	24.50	5 6-in wells, 212 ft. deep 1 8-in well, 265 ft deep	Pumping direct	Receiving basin, 204,000	60	5.2	95	350	350	160	2 Hor. comp dup Worthington, 750,000 gals each	1,500,000	60,000	171	43	34	
5	Caldwell	927	Village	1897	14,000	15.10	1 dug well, 20 ft deep, 15 ft. dia. and Duck Creek	Pumping to reservoir	210,000	60	4.0	80	125	125	0	1 Hor comp dup Snider-Hughes, 500,000 gals	500,000	Not obtainable				Combined water and light plant
6	Carthage	2,559	Village	1890	23,000	8.99	3 8-in and 1 6-in wells, 136-148 ft deep	Pumping direct	Receiving basin 60,000	60	7.0	90	330	325	30	2 Hor dup Laidlaw-Dunn Co., 1,000,000 gals each.	2,000,000	Not obtainable				Combined water & light plant cost $38,000.
7	Elmwood Place	2,532	Village	1898	15,000	5.92	From Carthage			60	6.0	80	251	251	2			Not obtainable				Cost is for mains only
8	Celina	2,815	Village	1895	50,000	17.76	5 6-in wells 192-312 ft deep	Pumping to standpipe	Rec. basin, 90,000, standpipe, 185,000	65	8.5	90	275	225	10	2 Hor comp dup Gordon, 1,000,000 gals each	2,000,000	100,000	577	115	35	
9	Chagrin Falls	1,586	Village	1897	35,000	22.06	10 springs	Pumping to reservoir	Rec basin, 75,000, res. 204,000	100	8.5	95	278	253	10	1 Hor comp dup Worthington, 750,000 gals	750,000	78,000	308	60	49	
10	Chicago Junction	2,348	Village	1890	35,000	14.91	7 6-in wells 52 to 73 ft deep.	Pumping to standpipe	Rec basin 175,000 standpipe, 90,000	40	5.8	85	286	286	15	1 Hor dup Stillwell-Bierce & Smith-Vaile, 1,000,000 gals	1,000,000	Not obtainable				
11	Chillicothe	12,976	Private	1882	300,000	23.12	8 8-in wells, 80-100 ft deep in bottom of a 23-ft dug well, 26 ft deep	Pumping to reservoir	3,500,000	65	23.0	95	1,500	1,100	10	2 Hor dup Worthington 1,500,000 and 2,000,000 gals cap	3,500,000	Not obtainable				
12	Clyde	2,515	Village	1881	37,000	14.71	1 10-in well, 231 ft. deep	Pumping direct	Reserve res. 800,000	60	8.0	95	552	500	20	2 Hor dup Gordon, 500,000 and 1,000,000 gals cap	1,500,000	Not obtainable				
13	College Hill	1,101	Village	1900	50,000	45.29	From Cincinnati	Pumping to standpipe	Rec basin, 110,000 standpipe, 100,000	70	8.0	80	61	61	61	1 triplex power Laidlaw-Dunn-Gordon, 400,000 gals	400,000	Not obtainable				
14	Winton Place	1,219	Village	1898	25,000	20.51	From Cincinnati			50	6.5	90	139	139	0			Not obtainable				Cost is for mains only
15	Columbiana	1,339	Village	1895	38,000	28.38	1 dug well 30 ft dia., 30 ft deep	Pumping direct		50	5.0	100	110	110	2	2 Hor comp dup Stillwell-Bierce & Smith-Vaile, 750,000 each	1,500,000	21,000	191	38	16	Combined water & light plant.
16	Corning	1,400	Village	1892	10,000	7.14	1 well 6 ft dia., 22 ft deep 1 well 6x18 ft., 32 ft deep 1 well 8 in dia., 45 ft. deep	Pumping to tanks	95,000	65	1.3	75	13	13	0	1 Hor Pulling, 150,000 gals	150,000	Not obtainable				Not used for domestic purposes.
17	Delaware	7,940	Private	1889	175,000	22.04	1 well 25 ft dia. 21 ft deep 1 well 6 in dia. 255 ft deep Gallery 1x6x293 ft long	Pumping to standpipe	235,000	60	19.0	90	802	776	337	2 Hor comp. dup Deane, 2,000,000 gals cap each	4,000,000	421,000	543	108	53	25 services off are for sprinkling only
18	East Palestine	2,391	Village	1889	25,000	10.03	1 well 22 ft dia. 22 ft deep	Pumping to reservoir.	350,000	85	4.5	95	400	400	4	1 Hor dup Gordon, 750,000 gals, 1 Hor comp dup McGowan, 750,000 gals	1,500,000	137,000	342	68	55	
19	Galion	7,282	Private	1882	100,000	13.73	1 well, 28 ft. dia., 28 ft deep 6 6-in wells, 70-90 ft deep 2 8-in wells, 70-90 ft. deep	Pumping to standpipe	Rec. basin, 150,000, standpipe, 155,000	65	14.0	90	490	430	48	2 Hor dup Deane, 1,500,000 gals. each	3,000,000	275,000	640	128	38	
20	Gibsonburg	1,791	Village	1897	28,000	15.63	1 10-in well, 290 ft deep 1 10-in well, 311 ft deep	Pumping to standpipe	Rec basin, 84,000, standpipe, 110,000	45	4.5	85	226	212	4	1 Gould triplex power, 150,000 gals	150,000	31,200	147	29	17	
21	Glendale	1,545	Village	1892	41,000	26.54	1 8-in well, 175 ft deep. 2 8-in wells, 175 ft deep	Pumping to standpipe.	135,000	60	10.0	80	175	175	2	1 Hor comp dup Gordon, 500,000, 1 Hor dup Gordon 500,000.	1,000,000	Not obtainable				
22	Glouster	2,155	Village	1900	18,000	8.35	Coal mine	Pumping to reservoir	125,000	70	4.0	80	38	38	0	1 Knowles, 125,000 gals cap.	125,000	Not obtainable				Not used for domestic purposes.
23	Greenwich	849	Village	1898	9,000	10.60	Dug well, 5-24 ft dia, 35 ft deep 1 6-in well, 100 ft deep Impounding reservoir	Pumping to standpipe.	Standpipe, 71,000 res., 10,000,000	40	2.0	80	70	70	2	1 Hor comp dup. McGowan, 500,000 gals	500,000	Not obtainable				
24	Hiram	659	Village	1897	14,000	21.24	2 Springs	Pumping to standpipe.	Standpipe, 50,000 rec basin, 75,000	75	3.0	90	75	75	0	1 Deming power, 250,000 gals	250,000	Not obtainable				
25	Jackson	4,672	Private	1900	100,000	21.42	8 8-in wells, 103-105 ft deep	Pumping to standpipe	Standpipe, 260,000, rec basin, 15,000	80	11.0	85	180	177	19	2 Hor comp dup Snider-Hughes, 1,000,000 gals each	2,000,000	Not obtainable				
26	Kent	4,541	Private	1887	200,000	44.04	9 6-in. wells, 62-84 ft deep Plum Creek	Pumping to standpipe	115,000	80	8.5	80	524	419	63	2 Hor comp dup Holly, 1,000,000 gals each.	2,000,000	818,000	1,822	364	180	
27	Lakeside	1,000	Private	1898	5,758	5.76	Lake Erie (filtered)	Pumping to tank	3,900	50	3.5	100	350	350	0	1 Hor dup Hughes, 250,000 gals each	250,000	Not obtainable				In use only from May 1st to Oct. 1st.
28	Leetonia	2,741	Village	1889	53,500	19.50	17 springs Cherry Fork	Pumping to reservoir.	500,000	50	8.0	90	360	348	5	2 Hor comp dup Gordon, 500,000 gals each.	1,000,000	117,000	336	67	43	
29	Leipsic	1,726	Village	1901	27,000	15.64	1 6-in wells, 135-138 ft deep 1 8-in well, 135 ft deep	Pumping to tank	40,000	45	5.0	90	25	25	0	2 Gould deep well pumps 50,000 gals. each	100,000	Not obtainable				
30	Logan	3,480	Village	1895	39,200	11.27	1 dug well, 25 ft dia., 26 ft deep	Pumping direct		65	8.5	85	280	275	0	2 Hor dup comp Worthington 1,000,000 gals each	2,000,000	190,000	691	138	55	
31	Marysville	3,048	Private	1891	85,000	27.89	1 8-in well, 145 ft deep	Pumping direct		60	8.0	80	425	422	1	2 Hor comp dup Hughes, 750,000 gals each	1,500,000	650,000	1,530	306	213	Combined water & light plant cost $130,000.
32	Medina	2,232	Village	1886	8,000	3.58	2 8-in wells, 100 ft deep.	Pumping to standpipe	100,000	40	1.0	20	68	60	3	1 Smith-Vaile deep well, 100,000, 1 McGowan deep well 50,000	150,000	15,000	250	50	12	New system put in in 1898 cost for this only.
33	Milan	653	Village	1888	12,000	18.38	Large well and impounding reservoir	Pumping direct	Large well, 1,000,000	40	2.2	75	47	47	0	1 Hor comp dup Hughes, 1,000,000 gals	1,000,000	19,000	404	80	29	
34	Milford Center	682	Village	1894	15,000	21.99	1 8-in well, 20 ft deep	Pumping direct		35	1.8	90	99	87	0	2 Hor dup McGowan, 500,000 gals each	1,000,000	Not obtainable				
35	Mingo Junction	2,951	Private	1899	40,000	13.88	Ohio River through filtering crib	Pumping to reservoir	400,000	100	2.5	90	300	300	0	1 Deming triplex power, 400,000 gals	400,000	Not obtainable				
36	Mt. Sterling	986	Village	1896	12,000	12.17	1 8-in well, 115 ft deep.	Pumping direct	Rec basin, 110,000	45	3.0	95	124	124	0	2 Hor dup McGowan, 500,000 gals each	1,000,000	150,000	1,210	240	152	
37	New Richmond	1,916	Village	1890	35,000	18.27	Ohio River	Pumping to reservoir	700,00	80	4.7	90	38	38	6	1 Vert Rumsey, 250,000 gals	250,000	30,000	789	158	16	Combined water & light plant; 25 services are for sprinkling only
38	North Baltimore	3,561	Private	1892	58,000	16.28	6-in wells, 125 ft deep	Pumping to standpipe	Res 400,000, standpipe 165,000	50	12.0	90	300	250	25	2 Hor comp dup Laidlaw-Dunn-Gordon, 1,000,000 gals each	2,000,000	Not obtainable				
39	Plain City	1,112	Village	1894	35,000	31.47	2 8-in wells, 365 ft deep	Pumping direct		40	6.0	75	330	300	1	2 Hor comp dup McGowan, 1,000,000 gals each	2,000,000	Not obtainable				Combined water & light plant
40	Pomeroy	4,639	Private	1899	12,000	5.65	Ohio River (filtered)	Pumping to reservoir	275,000	95	7.0	75	178	150	170	1 Hor comp duplex Buffalo 500,000 gals	500,000	85,000	155	91	1	Consumption for both towns
41	Middleport	2,799	Private	1890			From Pomeroy			95	4.5	75	71	69	69							Both plants owned by one company
42	Reading	3,076	Village	1892	50,000	16.25	3 8-in wells 150 ft deep	Pumping to reservoir	Rec basin 50,000, res. 1,000,000	80	6.0	75	60	60	18	1 Hor dup Laidlaw Dunn-Gordon, 1,000,000 gals	1,000,000	Not obtainable				Combined water & light plant
43	Rockford	1,207	Village	1897	17,000	14.08	2 6-in wells 100-111 ft deep	Pumping to standpipe	Standpipe 93,000 rec basin, 5,000	30	2.0	90	52	52	10	1 Hor comp dup Laidlaw-Dunn-Gordon, 500,000 gals	500,000	23,000	442	88	19	
44	Sabina	1,481	Village	1898	18,000	12.15	2 6-in wells, 125-150 ft deep 2 4-in wells, 125 ft deep	Pumping to standpipe	97,000	50	4.0	80	100	98	0	2 Hor comp. dup Smith-Vaile & Stillwell-Bierce, 500,000 each	1,000,000	30,000	306	61	20	Combined water & light plant cost $30,000
45	St. Bernard	3,381	Village	1895	90,000	26.60	1 8-in wells 130 ft deep	Pumping to standpipe	Standpipe 270,000, rec basin 37,000	70	8.0	90	213	210	85	2 Hor comp dup Laidlaw-Dunn Gordon, 1,000,000 gals each	2,000,000	161,800	769	154	44	Combined water & light plant; consumption is for both towns
46	Bond Hill	1,081	Village	1895	17,000	15.72	From St. Bernard			50	4.0	90	62	46	46							Mains only included in cost.
47	Salineville	2,353	Village	1892	45,000	19.12	1 well, 12 ft dia., 19 ft deep 1 well 20 ft dia., 35 ft. deep Yellow Creek	Pumping to reservoir	300,000	100	8.0	90	275	225	10	2 Hor comp dup Hughes, 700,000 gals each	1,400,000	250,000	1,100	220	106	
48	Union City	3,998	Village	1874	100,000	25.01	2 8-in wells 160 ft deep 1 30-ft well 29 ft deep 1 30-ft well, 31 ft deep	Pumping direct		35	17.0	80	665	665	37	1 Hor dup Deane, 1,000,000 gals., 1 Hor dup Laidlaw Dunn-Gordon, 1,000,000 gals	2,000,000	266,000	400	80	67	Data for both Ohio and Indiana
49	Washington C. H.	5,751	Private	1880	170,000	29.56	2 6-in wells, 150-170 ft deep 1 8-in well, 160 ft deep 1 20-ft well 45 ft. deep 1 30-ft well, 45 ft. deep 8 8-12-ft wells, 40-45 ft deep	Pumping to standpipe	293,000	15	17.0	90	560	507	483	2 Hor comp dup Worthington, 1,500,000 gals each, 1 Hor dup Smith-Vaile, 500,000 gals	3,500,000	Not obtainable				
50	Wellington	2,091	Village	1898	35,000	16.74	Impounding reservoir	Pumping to standpipe	Standpipe 93,000 res. 3,000,000	50	1.5	80	15	15	15	1 Hor. dup Snider-Hughes 1,000,000 gals	1,000,000	20,000	1,330	266	10	Combined water & light plant. Not used for domestic purposes.
51	Wyoming	1,450	Village	1892	50,000	34.48	1 8-in wells, 140-200 ft. deep	Pumping to reservoir.	Res., 3,000,000; rec basin, 30,000	100	9.6	90	200	200	200	1 Hor comp dup. Laidlaw-Dunn-Gordon, 1,000,000 gals	1,000,000	120,000	600	120	82	
52	Hartwell	1,833	Village	1891	23,000	12.55	From Wyoming			100	4.0	80	210	175	2			41,000	234	45	22	Cost is for mains only.
53	Lockland	2,695	Village	1894	21,000	7.79	From Wyoming			100	11.0	90	175	172	5			53,000	308	60	20	Cost is for mains only.
54	Arlington Heights	360	Village	1896	6,000	16.67	From Lockland			100	3.0	90	44	44	3			4,000	91	20	11	Cost is for mains only.
	Totals and averages	144,261	Public 41	1894	$2,651,458			Pumping to standpipe, 25 To reservoir 16 Direct, 13		64	372.5	84	14,180	13,287	2,210		61,625,000	4,441,000	589	118	53	
		2,672	Private, 13		$50,084	17.96					6.9		263	246	41		1,141,200	158,600				

Wyoming, being supplied to the Hartwell mains through a meter. The distribution system cost $23,000, which is a per capita cost of $12.55.

There are 4.0 miles of mains in, giving some 80 percent of the people access to the water.

There are 216 services in, 175 of which are in use and 2 of these metered. The average daily consumption is 41,000 gallons, which is 234 gallons per service, 45 gallons per consumer, and 22 per capita of the village population.

Lockland. Population 2695. This village has had a public water supply since 1894, when it was first secured from Reading. Later, on the expiration of the old contract, the supply was secured from Wyoming, which still furnishes the water.

Lockland sells a portion of its supply to the village of Arlington Heights. The distribution system cost $21,000, which is a per capita cost of $7.79.

In Lockland there are 11.0 miles of mains giving some 90 percent of the people access to the water. There are 175 services in, 172 of which are in use and 5 of these metered.

The average daily consumption is 53,000 gallons, which is 308 gallons per service, 60 per consumer and 20 gallons per capita of the village population.

Where the public supply is not available, water is obtained from shallow dug wells.

Arlington Heights. Population 360. This village secured its supply from Lockland in 1896. The distribution system cost $6,000, which is a per capita cost of $16.67.

There are 3 miles of mains in, giving some 90 percent of the people access to the water. There are 44 services in, all of which are in use and 3 of these metered.

The average daily consumption is 4000 gallons which is 91 gallons per service, 20 per consumer and 11 per capita of the village.

SUMMARY.

The data contained in the detailed descriptions of the previous section have been collected in Table II.

In this table there is given the principal items concerning each supply, in a form that is easily accessible for reference and comparison.

In all, there are fifty-four towns, containing 144,261 people, supplied from forty-seven separate water-works. Of these plants, twelve are owned by private companies, and thirty-five by the cities and villages; while of the fifty-four towns supplied, thirteen receive their water from private companies and forty-one from plants owned by themselves or neighboring corporations.

The large number of plants that have been installed in recent years is shown in the following table:

TABLE III — DATE OF INSTALLATION OF PUBLIC WATER SUPPLIES.

Year	1871–1880.	1881–1890.	1891–1893.	1894–1896.	1897–1901.
Number	1	11	9	14	19

The recent growth is also shown by the fact that the average age of the plants is only six years.

The total cost of the systems for the fifty-four towns is $2,654,548 or an average cost of $50,084. In this figure there is included the cost of six small electric light plants which were installed with the water-works, and for which it was impossible to make a proper division of the cost. These plants were so small, however, that the average as given will not be materially affected. If the average is made on the number of separate water-works, forty-seven, it will be $56,478.

In the next column of Table II. there is given the cost of each plant for each inhabitant of the respective towns. This figure ranges from $3.58 to $45.29 with $17.96 as the average. This average per capita cost is lower than is usually found on account of the large number of villages which have installed a distribution system only, also on account of the low cost of the several plants put in for fire purposes, which are neither extensive enough for general use, nor able to furnish potable water.

In regard to the method of supplying the water it is seen that twenty-five pump to standpipes or elevated tanks, sixteen pump to reservoirs and thirteen pump direct.

The average pressure on the mains ranges from thirty-five to one hundred pounds, with an average of sixty-four pounds.

The total number of miles of mains in is 372.5 with 6.9 as the average, and to these mains in the average town, eighty-four percent of the people have access.

On account of the exceptional uniformity in the size of the towns of this group, the average of the percentages of population accessible to the mains is nearly equal to the percent of the total number accessible. This latter is 85.3 percent, which means that of the total population of the towns, the above percentage can reach the public water supply if they so desire.

The average number of services in is 263, the average number in use is 246, and the average number of these metered is forty-one. In the average town of this group 17 percent of the services are metered, and the range is from none metered to, in a few cases, 100 percent metered.

From the number of services in use and from the character of the respective cities and villages, it is estimated that the total population using

TABLE IV—MONTHLY AND YEARLY VARIATION IN CONSUMPTION

Town	Year	January	February	March	April	May	June	July	August	September	October	November	December	Total for last twelve months available	Daily average	Monthly average	Estimated population	Services in use	Population actually supplied	Average daily consumption per capita	Average daily consumption per service	Average daily consumption per consumer.
Springfield	1883	17,254,000	11,494,000	13,753,000	15,377,000	16,746,000	17,088,000	22,208,000	23,625,000	23,543,000	20,568,000	20,553,000	24,336,000	226,605,000	18,884,000	621,000	24,078	1,007	5,538	26	617	112
Springfield	1884	34,545,000	24,634,000	28,124,000	26,717,000	37,347,000	41,580,000	33,922,000	35,526,000	33,483,000	30,214,000	29,713,000	37,094,000	371,899,000	30,992,000	1,016,000	25,194	1,239	6,814	40	820	149
Springfield	1885	39,684,000	38,597,000	36,795,000	41,495,000	33,269,000	34,149,000	37,673,000	33,064,000	29,327,000	31,504,000	32,095,000	36,853,000	424,505,000	35,375,000	1,163,000	26,310	1,433	7,881	44	811	147
Springfield	1886	42,037,000	33,011,000	34,830,000	32,805,000	31,505,000	31,338,000	35,829,000	34,203,000	35,597,000	36,166,000	33,973,000	38,204,000	419,198,000	34,958,000	1,149,000	27,426	1,556	8,558	42	738	134
Springfield	1887	42,089,000	35,591,000	40,942,000	40,390,000	42,821,000	42,716,000	49,767,000	44,759,000	41,483,000	40,509,000	38,868,000	41,715,000	501,650,000	41,804,000	1,374,000	28,542	1,700	9,350	48	808	147
Springfield	1888	46,772,000	42,822,000	46,566,000	41,540,000	42,588,000	47,326,000	47,535,000	46,837,000	46,989,000	47,339,000	42,106,000	42,782,000	541,202,000	45,100,000	1,483,000	29,658	1,856	10,208	50	799	143
Springfield	1889	44,425,000	40,897,000	44,758,000	45,039,000	50,089,000	45,217,000	53,367,000	60,764,000	52,571,000	49,174,000	44,135,000	44,154,000	573,590,000	47,799,000	1,571,000	30,776	2,043	11,236	51	769	140
Springfield	1890	48,084,000	45,810,000	52,476,000	52,717,000	52,178,000	59,396,000	64,849,000	60,355,000	53,257,000	54,892,000	67,832,000	51,854,000	663,700,000	55,308,000	1,818,000	31,895	2,293	12,611	57	793	144
Springfield	1891	51,227,000	46,000,000	55,533,000	54,373,000	62,891,000	65,648,000	78,513,000	82,401,000	84,955,000	82,119,000	73,062,000	73,296,000	810,048,000	67,504,000	2,216,000	32,531	2,539	13,915	68	873	159
Springfield	1892	68,579,000	57,296,000	62,386,000	59,618,000	61,932,000	70,682,000	74,190,000	78,410,000	72,455,000	69,843,000	74,426,000	78,291,000	828,108,000	69,034,000	2,264,000	33,167	2,761	15,185	68	820	148
Springfield	1893	88,135,000	74,025,000	75,899,000	62,541,000	69,668,000	75,563,000	84,576,000	85,354,000	85,869,000	84,564,000	58,915,000	68,151,000	913,260,000	76,105,000	2,502,000	33,803	2,985	16,417	74	838	152
Springfield	1894	66,981,000	66,005,000	71,822,000	65,804,000	74,476,000	87,261,000	87,033,000	82,054,000	80,569,000	81,271,000	77,941,000	77,281,000	918,492,000	76,541,000	2,516,000	34,439	3,160	17,380	73	796	145
Springfield	1895	85,766,000	88,069,000	87,449,000	84,200,000	91,612,000	103,261,000	99,299,000	105,860,000	97,943,000	91,194,000	72,203,000	78,382,000	1,085,238,000	90,436,000	2,973,000	35,075	3,406	18,733	85	873	159
Springfield	1896	83,723,000	68,215,000	74,334,000	67,476,000	74,217,000	81,841,000	66,312,000	63,916,000	57,850,000	56,391,000	48,975,000	52,077,000	795,427,000	66,277,000	2,173,000	35,711	3,529	19,409	61	616	112
Springfield	1897	54,368,000	52,735,000	57,710,000	53,358,000	55,255,000	60,503,000	71,509,000	65,757,000	71,361,000	68,922,000	60,850,000	66,534,000	738,952,000	61,579,000	2,025,000	36,347	3,646	20,053	56	555	101
Springfield	1898	71,117,000	59,215,000	67,006,000	66,093,000	67,692,000	92,075,000	85,968,000	74,379,000	79,544,000	77,124,000	69,797,000	77,311,000	887,321,000	73,943,000	2,436,000	36,983	3,725	20,488	66	654	110
Springfield	1899	76,445,000	82,013,000	78,510,000	74,685,000	100,774,000	113,033,000	118,056,000	150,127,000	119,735,000	85,207,000	74,652,000	82,224,000	1,156,481,000	96,373,000	3,168,000	37,619	3,862	21,241	84	820	148
Springfield	1900	91,914,000	82,850,000	85,928,000	81,983,000	85,230,000	90,755,000	100,396,000	110,107,000	104,357,000	99,888,000	95,754,000	91,439,000	1,120,601,000	93,383,000	3,070,000	38,253	4,040	22,220	80	760	138
Dayton	1895													1,327,764,000	110,647,000	3,638,000	73,275	6,800	37,400	50	535	97
Dayton	1896	107,684,000	103,518,000	104,153,000	113,456,000	137,716,000	135,776,000	144,980,000	144,776,000	127,373,000	129,425,000	133,593,000	122,194,000	1,504,844,000	125,404,000	4,112,000	75,686	7,500	41,250	54	548	100
Dayton	1897	130,610,000	127,595,000	141,900,000	124,810,000	129,695,000	139,852,000	161,278,000	145,525,000	156,850,000	140,319,000	116,139,000	122,169,000	1,636,751,000	136,396,000	4,484,000	78,097	7,900	43,450	57	568	103
Dayton	1898	120,162,000	113,920,000	128,311,000	132,780,000	137,553,000	155,490,000	162,223,000	159,103,000	159,069,000	157,978,000	148,323,000	180,289,000	1,755,201,000	146,266,000	4,809,000	80,508	8,400	46,200	60	572	104
Dayton	1899	170,111,000	179,104,000	138,284,000	147,908,000	165,516,000	172,169,000	176,949,000	188,511,000	161,523,000	130,911,000	141,633,000	143,402,000	1,925,057,000	160,421,000	5,274,000	82,919	9,000	49,500	64	586	107
Dayton	1900	155,274,000	158,289,000	112,732,000	138,482,000	161,898,000	151,019,000	163,938,000	174,206,000	157,121,000	151,715,000	148,583,000	157,401,000	1,860,657,000	155,055,000	5,098,000	85,333	9,500	52,250	60	537	98
Urbana	1900	32,676,000	27,983,000	32,581,000	34,406,000	35,178,000	34,443,000	36,511,000	39,911,000	37,100,000	41,100,000	40,200,000	35,100,000	427,189,000	35,599,000	1,170,000	6,808	910	4,550	186	1,286	257
Troy	1899							16,764,000	18,559,000	16,223,000	12,985,000	11,907,000	13,367,000									
Troy	1900	13,636,000	13,581,000	15,766,000	16,048,000	18,391,000	16,026,000							183,453,000	15,288,000	503,000	5,881	904	4,970	86	506	101
Greenville	1899								9,763,000	6,261,000	4,956,000	4,834,000	6,263,000									
Greenville	1900	6,081,000	5,424,000	5,938,000	6,254,000	7,958,000	7,725,000	8,116,000						79,573,000	6,631,000	218,000	5,501	450	2,250	40	484	97
Lebanon	1899			1,980,000	2,277,000	2,798,000	3,398,000	1,540,000	4,789,000	4,492,000	2,060,000	2,179,000	2,699,000									
Lebanon	1900	3,158,000	2,794,000											38,243,000	3,187,000	105,000	2,867	430	2,150	37	244	49
Hamilton	1897						42,696,000	55,584,000	51,122,000	49,564,000	45,858,000	41,589,000	36,623,000	527,301,000	43,942,000	1,147,000	22,016	2,600	14,300	66	556	101
Hamilton	1898	35,645,000	32,903,000	46,708,000	54,623,000	40,185,000	66,638,000	80,366,000	57,400,000	53,160,000	50,929,000	50,147,000	57,763,000	542,101,000	45,175,000	1,485,000	22,645	2,689	14,790	66	552	100
Hamilton	1899	51,581,000	50,099,000	56,093,000	51,420,000	56,826,000	57,640,000	67,425,000	65,651,000	66,937,000	58,358,000	50,617,000	50,375,000	691,481,000	57,624,000	1,894,000	24,280	2,900	15,950	81	653	119
Hamilton	1900	50,530,000	47,521,000	49,180,000	46,102,000	53,090,000								663,428,000	55,286,000	1,818,000	23,914	3,195	17,572	76	569	103
Eaton	1899	1,149,000	1,350,000	1,826,000	1,139,000	1,446,000	1,807,000	2,351,000	2,819,000	2,761,000	2,362,000	1,278,000	1,307,000	21,598,000	1,800,000	59,200	3,133	397	1,985	19	149	30
Eaton	1900	1,383,000	1,910,000	1,563,000	1,348,000	2,150,000	1,993,000	2,214,000	2,267,000	2,364,000	1,665,000	1,291,000	1,277,000	21,456,000	1,788,000	58,800	3,155	407	2,035	19	144	29
Kent	1899									24,826,000	25,712,000	22,711,000	24,400,000									
Kent	1900	24,875,000	22,132,000	24,943,000	22,919,000	25,436,000	25,936,000	26,582,000	28,456,000					298,928,000	24,911,000	818,000	1,541	449	2,245	180	1,822	364
Delaware	1892	4,889,000	4,334,000	4,631,000	4,321,000	4,671,000	5,996,000	6,784,000	7,088,000	7,084,000	7,593,000	6,618,000	7,025,000	71,034,000	5,920,000	194,000	8,168			24		
Delaware	1893	7,051,000	5,941,000	6,492,000	6,913,000	7,857,000	9,451,000	9,882,000	8,888,000	8,465,000	6,919,000	5,812,000	5,804,000	89,478,000	7,456,000	245,000	8,140			30		
Delaware	1894	5,534,000	4,745,000	5,211,000	5,243,000	6,724,000	8,797,000	10,079,000	10,331,000	10,494,000	9,270,000	7,029,000	6,599,000	90,065,000	7,505,000	247,000	8,112			30		
Delaware	1895	6,745,000	7,773,000	10,839,000	7,529,000	8,765,000	11,412,000	12,097,000	11,989,000	10,654,000	9,821,000	8,307,000	8,062,000	113,425,000	9,452,000	311,000	8,084			38		
Delaware	1896	7,698,000	7,404,000	7,826,000	7,551,000	8,745,000	8,342,000	7,594,000	7,776,000	5,754,000	7,148,000	7,141,000	7,546,000	90,528,000	7,514,000	247,000	8,056			31		
Delaware	1897	7,807,000	6,550,000	6,710,000	6,772,000	7,930,000	8,911,000	9,138,000	9,731,000	11,068,000	10,424,000	8,328,000	7,938,000	101,307,000	8,442,000	278,000	8,028	656	3,280	33	424	85
Delaware	1898	8,566,000	7,375,000	8,226,000	8,260,000	9,386,000	12,532,000	12,730,000	11,260,000	12,980,000	9,614,000	9,071,000	9,521,000	119,530,000	9,961,000	327,000	8,000	690	3,450	41	472	94
Delaware	1899	8,850,000	9,568,000	8,918,000	9,271,000	11,074,000	13,252,000	13,099,000	13,580,000	12,199,000	11,471,000	10,637,000	9,692,000	131,611,000	10,968,000	361,000	7,972	716	3,580	45	504	101
Delaware	1900	10,479,000	10,054,000	10,803,000	10,333,000	14,211,000	13,376,000	13,926,000	13,573,000	14,204,000	18,216,000	12,876,000	11,504,000	153,535,000	12,795,000	421,000	7,190	770	3,880	53	542	108
East Palestine	1899												4,000,000									
East Palestine	1900	4,511,000	4,500,000	4,355,000	3,907,000	4,210,000	4,170,000	4,400,000	4,694,000	4,180,000	3,850,000	3,300,000		50,167,000	4,181,000	137,000	2,493	400	2,000	55	342	68
Leetonia	1899	4,390,000	4,039,000	3,401,000	2,926,000	4,000,000	3,817,000	3,317,000	4,555,000	4,008,000	3,580,000	3,381,000	2,718,000	44,252,000	3,688,000	121,000	2,736			44		
Leetonia	1900	4,505,000	3,598,000	4,203,000	3,642,000	3,602,000	3,496,000	3,577,000	3,810,000	3,019,000	3,006,000	3,088,000	2,986,000	42,532,000	3,544,000	117,000	2,744	348	1,740	43	336	67
St Bernard & Bond Hill	1900	4,869,000	4,329,000	4,860,000	4,050,000	6,255,000	6,534,000	7,146,000	7,614,000	8,226,000	6,282,000	5,436,000	5,328,000	71,829,000	5,986,000	197,000	4,165	256	1,280	44	770	154
Wyoming, Hartwell, Lockland, Arlington Heights	1897													52,727,000	4,394,000	144,000						
Wyoming, Hartwell, Lockland, Arlington Heights	1898													59,567,000	4,964,000	158,000						
Wyoming, Hartwell, Lockland, Arlington Heights	1899	3,101,000	3,080,000	3,591,000	3,473,000	6,873,000	7,731,000	11,070,000	10,476,000	8,580,000	6,344,000	3,591,000	4,087,000	72,920,000	6,077,000	200,000						
Wyoming, Hartwell, Lockland, Arlington Heights	1900	4,930,000	3,710,000	3,604,000	3,836,000	6,597,000	5,784,000	10,756,000	7,071,000	8,518,000	7,163,000	5,741,000	3,510,000	71,752,000	5,979,000	197,000	6,338	591	3,000	31	333	66
Totals		2,050,600,000	1,925,242,000	2,000,719,000	1,949,113,000	2,146,286,000	2,286,601,000	2,465,060,000	2,462,838,000	2,325,382,000	2,203,528,000	2,031,233,000	2,112,987,000	27,908,064,000								
Averages		42,720,831	40,109,208	41,682,271	40,606,521	44,711,292	47,637,583	51,367,917	51,309,104	48,447,542	45,906,833	42,317,354	44,020,562	53,069,469	4,472,456	146,987,000	25,891	2,691	14,704	57	646	118
Monthly variation 100 — mean		94.8	89.0	92.5	90.1	99.2	105.7	114.0	113.8	107.8	101.9	93.9	97.7									

All figures in gallons

the public water supply is 67,140 which is 54.5 percent of the population accessible to the water, and 46.5 percent of the total population.

According to this estimate, over half of the people who live in towns having a public water supply do not make use of same.

In places where it was possible to estimate the average daily consumption, the total pumping capacity ranges from five times the average daily consumption, in Gibsonburg, to seventy-one times in Columbiana.

In a number of cases it would seem that the enormous pumps installed would be worn out before the maximum consumption would in any way nearly equal the total pumping capacity.

In the twenty-eight places where the average daily consumption was obtained, the average is 158,600 gallons, and the average per service is 589, per consumer 119, and per capita of the total population the average is 53 gallons.

This question of consumption is further considered in Table IV.

In this table there is given the monthly and yearly variation in the consumption for all towns in the above list, and also for all supplies in the Great and Little Miami watersheds, where accurate data could be secured.

In all the monthly consumption was secured in thirteen cities and villages for a total of forty-eight years. The monthly variation follows in general the acknowledged law with a rather curious falling off in February. It is conceded that the winter rise in consumption is due to the letting of hydrants run to prevent freezing, and as yet it is not easy to explain why the February consumption should be less than that for March. The consumption for this group is a little below the average for all the winter months, which is no doubt explained by the fact that nearly all the towns of the group are from the southern part of the state where the cold snaps are not so long continued as in the northern part.

It will be well to mention here that this table is only one of a preliminary set which is being prepared so that the data will be available for a final table which will include all sections of the state and give each city its proper weight, which is not done here.

In the results for Springfield the steady increase in the per capita consumption is very clearly shown, while the increase per service and per consumer is not nearly so decided. Dayton shows this same increase in the per capita consumption with the like irregularity in the increase per consumer.

Delaware, however, shows a decided increase in the average daily consumption for both the inhabitants and the consumer, or service, from which the number of consumers is obtained.

In Table V., there is given certain information in regard to the franchises granted to the private water companies by the respective cities and villages.

Lakeside is included in this table merely to bring out the fact that it is supplied by a private company. The village, if it may be called such, is owned and controlled by the company, so under the circumstances could grant no franchise.

In the twelve other companies, the franchises run from twenty years to "perpetual." In seven cases there is a purchasing clause in the franchise, while five are silent in this important respect. The water rates are more or less fixed in the franchises, or by contract in eight cases and not regulated in any way in the remaining four.

In nine cases something is said in regard to the kind of water to be supplied, but in no case is the specification of such a nature that the company could be easily compelled to furnish a strictly potable water.

It is certainly necessary to again call attention to this very important omission in the franchises granted private companies. The insurance interests see to it that the requirements as to pressure and quantity of water are very carefully made, but there seems to be no one sufficiently interested that can compel the insertion of proper articles in reference to the quality of the water to be furnished.

As is customary, the water rates are tabulated, both for convenience and for the saving in space secured thereby.

In Table VI. there is given the flat rates for the ordinary domestic uses, the meter rates, and the rate for a standard house, etc., as specified, for a comparison of rates. The wide range found in this comparison is to a considerable extent due to the extreme range in the charges for sprinkling.

In some cases the sprinkling of both street and lawns are free, while in others they are charged for at what must be, from the comparison, enormous rates.

It is also necessary to note that the average for the thirty public supplies is $17.43, while for the nine private it is $23.83; the total average being $18.93.

SEWERAGE.

The data in reference to the sewerage of the above list of towns has been tabulated, Table VII., in such a manner that with a few additional notes it is believed that a fair idea of the extent of the systems can be readily obtained.

In a number of cases the table will give all the information available and no further mention need be made here.

Arlington Heights has a few short semi-private sewers for surface water and sink drainage, but not used as yet for closets.

It will be noted that Athens has one of the most complete systems of the whole group. Its storm sewers are not developed to any extent as the village site is quite hilly and no part of the corporation is far removed from the Hocking River.

TABLE VI—WATER RATES.

			Flat Rates.												Meter Rates								Specimen for comparison of rates.
															Rate per 1,000 gallons for a consumption in gallons per day of the following amounts								
Number.	Place.	Ownership.	House occupied by one family and supplied by one faucet.	Each additional person or room	Each additional family	One bath tub, hot and cold.	Each additional tub.	One water closet	Each additional water closet.	One wash basin.	Sprinkling	Private stable, one horse and carriage.	Each additional horse.	Minimum rate.	100 to 500.	500 to 1,000.	1,000 to 2,000	2,000 to 5,000.	5,000 to 10,000	10,000 to 25,000	25,000 and over.	Minimum rates	8-room house, value $5,000 6 in family. House provided with 1 bath tub, 1 water closet, 1 kitchen sink 1 yard hydrant for sprinkling lawn and street. Lot 50x100 feet. Stable with 1 horse and carriage
1	Arlington Heights	Village	5 rooms or less, $4.00	$0.50		$1.00	$1.00	$2.50	$1.50	$1.00	Lawn and street front, 50x100 ft $5.50 Each additional foot front....... 0.02 Each additional sq yd. in rear 100 ft. 0.01	$2.00			$0.40	$0.13	$0.13	$0.13	$0.13	$0.13	$0.13	$10.00	$17.50
2	Athens	Village	$5.00		$3.00	$3.00	$2.00	$3.00	$2.00	$1.00	Lawn, 66 feet front or less...... $5.00 Each additional foot front... ...... .05 Street free with general use...... ..	$3.00	$1.50	$5.00	$0.30	$0.25	$0.20	$0.15	$0.12	$0.08	$0.08	$5.00	$19.00
3	Berea	Village	$6.00	†							Lawn and street, 66 ft. front or less $6.00 Each additional foot front ... .10	2 horses, $6.00	$1.50		$0.30 to $0.20	$0.15	$0.10	$0.10	$0.10	$0.10	$0.10	$6.00	*
4	Bond Hill	Village	All services metered..												$0.40 to $0.25	$0.20	$0.12½	$0.10	$0.10	$0.10	$0.10	Meter rent, $1.20, $1.80	*
5	Bowling Green	Private	3 to 4 rooms, $4.00 5 to 6 rooms, $6.00	$0.25		$3.00	$1.00	$2.00	$1.50		Lawn and street, 50 ft front or less $6.00 Each additional foot front.. ...... .10	$2.00	$1.00		$0.30	$0.25	$0.20	$0.18	$0.16	$0.16	$0.16		$19.50
6	Cadiz	Village	5 rooms or less, $5.00	$1.00		$2.00		$4.00	$4.00	$1.00	Lawn, $0.50 to $3.00... Street, free with general use	$3.00	$1.00		$0.50 to $0.20	$0.15	$0.12	$0.08	$0.05	$0.05	$0.05	$10.00	$18.00
7	Caldwell	Village	4 rooms or less, $3.50	$0.50	$3.50	$2.00	$1.00	$2.50	$1.00	$1.25	Lawn and street $2.00	$2.00	$1.00	$3.50	$0.15	$0.15	$0.12	$0.10	$0.08	$0.06	$0.00	$3.50	$15.25
8	Carthage	Village	4 rooms or less, $4.00	$0.50	$4.00	$2.00	$1.00	$2.50	$1.00	$2.00	Street, 25 feet front or less. .... $3.00 Each additional foot front. .. .03 Yard, 25 feet front or less ... 3.00 Each additional ft. front 20 ft. deep .02 Each additional square yard ..... .005	$2.50	$1.00		$0.40 to $0.25	$0.20	$0.12	$0.12	$0.10	$0.10	$0.08		$24.22
9	Celina	Village	7 persons or less, $5.00	$0.25	$5.00	$3.00	$1.00	$2.50	$1.50		Lawn and street, 50 ft front and 165 feet deep or less .. $5.00 Each additional foot front. .05	$2.50	$1.00		$0.50 to $0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$15.00	$18.00
10	Chagrin Falls	Village	8 rooms or less, $5.00	$0.50		$2.00	$1.00	$3.00			Lawn and street, with general use. $2.00	$2.00	$1.00		$0.25						$0.07		$14.00
11	Chicago Junction	Village	5 persons or less, $4.00	$0.35	$2.50	$2.00	$2.00	$2.00			Lawn and street, with general use. $2.00	$2.00	$1.00		$0.30	$0.25	$0.15	$0.10	$0.09	$0.08	$0.07		$12.25
12	Chillicothe	Private	4 rooms or less, $4.00	$0.75		$2.50	$2.50	$3.00	$3.00		Lawn, free with general use ... Street, 19 feet front or less .. .$5.00	$2.00			$0.20	$0.17	$0.15	$0.15	$0.15	$0.15	$0.15		$19.50
13	Clyde	Village	$3.00			$3.00	$2.00	$2.00	$2.00		Lawn and street ....$5.00 Stable included	$2.00	$1.00		$0.20	$0.20	$0.10	$0.10	$0.07	$0.07	$0.07		$13.00
14	College Hill	Village	All services metered..												$0.35	$0.35	$0.35	$0.35	$0.35	$0.35	$0.35		*
15	Columbiana	Village	6 rooms or less, $4.00	$0.50	$2.00	$2.00	$2.00				Lawn and street $5.00	$3.00	$1.00	$3.00	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08	$3.00	*
16	Corning	Village	Not used for domestic purposes																				*
17	Delaware	Private	6 rooms or less, $5.00	to 13, $1.00 above 13 $0.50	$5.00	$3.00	$3.00	$3.00	$3.00		Lawn, 100 feet square or less.. . $5.00 Street, 66 feet front or less .... $6.00 Each additional 10 ft. front.. . .. 1.00	$3.00	$3.00		$0.25	$0.25	$0.20	$0.15	$0.10	$0.08	$0.05	$5.00	$43.00
18	East Palestine	Village	6 rooms or less, $4.00	$0.50		$2.00	$2.00	$2.00	$2.00		Lawn, 1,000 ft square or less ..$3.00 Each additional square. . 0.20 Street, 60 feet front or less.... ... 3.00 Each additional foot front .... .06	$3.00	$1.00	$4.00	$0.15	$0.15	$0.15	$0.15	$0.15	$0.15	$0.15	$4.00	$18.78
19	Elmwood Place	Village	5 rooms or less, $3.50	$0.50	$3.50	$2.00	$1.00	$2.50	$1.00	$1.00	Street, 25 feet front or less... . $1.50 Each additional foot front..... . .02 Yard, 25 feet front or less. . 1.50 Each additional foot front ... .. .02	$1.50	$1.00		$0.10 to $0.35	$0.20	$0.12½	$0.12½	$0.10	$0.10	$0.08		$16.00
20	Galion	Private	5 rooms or less, $5.00	$1.00		$4.00	$2.00	$4.00	$2.00		With house use......... Lawn and street, 60 ft. front or less 5.00 Each additional foot front .... .13	$3.00	$2.00	$5.00	$0.25	$0.25	$0.10	$0.10	$0.10	$0.10	$0.10	$10.00	$24.32
21	Gibsonburg	Village	$3.00			$2.00	$2.00	$2.00	$2.00		Lawn and street, 50 ft front or less $2.00 Each additional 50 feet front 1.00	$2.00 1st add $1.00	$0.50		$0.20	$0.17	$0.14	$0.10	$0.08	$0.08	$0.08	$3.00	$11.00
22	Glendale	Village	4 rooms or less, $4.00	$0.50		$3.00	$2.00	$3.00	$2.00	$1.00	Lawn, 1,000 square feet or less. . $1.00 Each additional 20 square feet.... . .01 Street, 50 feet front or less......... 3.00 Each additional foot front... . . .02	$2.50	$1.00	$4.00	$0.40 to $0.25	$0.20	$0.12½	$0.12½	$0.10	$0.10	$0.10	$20.00	$21.50
23	Glouster	Village	Not used for domestic purposes								Lawn and street with use in stables $5.00				§								*
24	Greenwich	Village	6 rooms or less, $3.00	$0.50		$2.00					Lawn and street, 66 ft front or less $4.00 Each additional foot front .... .05 Gardens 2.00	$2.00	$1.00		§								*
25	Hartwell	Village	5 rooms or less, $4.00		50% Increase	$2.00	$1.00	$2.50	$1.00	$1.00	Lawn, 50x150 feet ... . $3.50 Each additional ft. front . . .... .02 Street, per foot front. . ... .10	$2.50	$1.00		$0.15	$0.12	$0.12	$0.12	$0.12	$0.13	$0.08		$22.00
26	Hiram	Village	$6.00		$0.00	$2.00		$2.00			Lawn and street. ......$2.00 to 3.00	$2.00 1st add., $2.00	$1.00		$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50		$16.00
27	Jackson	Private	$6.00			$4.00		$4.00		$2.00	Lawn and street $6.00	$3.00	$1.00		$0.35	$0.35	$0.30	$0.20	$0.18	$0.15	$0.15		$25.00
28	Kent	Private	3 rooms or less, $3.75	$0.62½		$2.50		$2.50		$1.50	Lawn and street, 60 ft front or less $3.00 100 ft. front or less 4.00 Each additional foot front..... .. .05	$1.25	$1.25		$0.16	$0.16	$0.16	$0.16	$0.16	$0.13	$0.12 to $0.09		$17.62
29	Lakeside	Private	$3.50			$1.00		$2.00			Street and yard 3.00				§							Rates are for season ...	*
30	Leetonia	Village	5 rooms or less, $5.00	$0.50		$3.00		$3.00			Lawn, 40 feet front or less ... $3.00 40 to 60 feet front....... . 4.00 Each additional foot front....... .02 Street 1.00	$1.00	$1.00		$0.15	$0.15	$0.15	$0.15	$0.10	$0.08	$0.05 to $0.03		$18.50
31	Leipsic	Village	5 persons or less, $4.00	$0.25	$4.00	$3.00	$1.00	$2.00	$1.00		Street, per foot front.. ....$0.25 Lawn, 50 feet front or less... ....4.00 Each additional foot front .. .... .05	$2.00	$1.00		$0.30	$0.25	$0.15	$0.10	$0.09	$0.08	$0.07		$27.50
32	Lockland	Village	4 rooms or less, $3.50	$0.50	$3.50	$2.00	$1.00	$2.50	$1.00		Lawn, 50 ft. front, 150 ft. deep....$3.00 Each additional foot front........ .02 Each additional 100 square feet... .015 Street, 25 feet front or less.... ... 1.50 Each add ft front 02	$2.00	$1.00		$0.40 to $0.25	$0.20	$0.12½	$0.12½	$0.10	$0.10	$0.08		$17.00
33	Logan	Village	$4.00			$3.00	$1.00	$2.00	$1.00		Lawn and street included with general use	Included in general use ..			$0.30 to $0.10	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08		$9.00
34	Marysville	Private	6 rooms or less, $5.00	$0.50	$5.00	$3.00	$3.00	$3.00	$3.00		Lawn and street, 66 ft. front or less $5.00 Each additional foot front ...... .06	$3.00	$1.00		$0.25	$0.25	$0.15	$0.11 2-3	$0.05	$0.05	$0.05	$5.00	$19.00
35	Medina	Village	$6.00			$2.00	$2.00	$4.00	$4.00		Lawn, 60 feet front or less $5.00 Each additional foot front ... .05 Street, 40 feet front or less . .... 6.00 Each additional foot front .. .. .06	$3.50	$1.00		$0.15	$0.15	$0.12	$0.09	$0.07	$0.06	$0.06		$26.10
36	Middleport	Private	All services metered...												$0.30 to $0.25	$0.20	$0.15	$0.10	$0.09	$0.05	$0.05		*
37	Milan	Village	5 rooms or less, $5.00	$0.30	$5.00	$2.00		$1.50			Street, 60 feet front or less .. $2.00 Each additional foot front. . .10 Lawn 3.00	$3.00	$1.50		§								$16.40
38	Milford Center	Village	4.00			$1.00	$1.00	$1.00	$1.00	$1.00	With general use, lawn and street. $2.00	$4.00			§								$13.00
39	Mingo Junction	Private	2-3-4 rooms, $6.00 5 6-7 rooms, 10.00 8-9-10 rooms, 12.00	$1.00		$3.50		$4.00	$3.50	$1.50	Lawn and street, 50 ft front or less $3.50 50 to 75 feet front ... .. 5.00 Over 75 feet front 7.00	$2.50	$2.00		§								$27.00
40	Mt. Sterling	Village	$5.00			$3.00	$1.00				Lawn and street $3.00	$1.00	$1.00		$0.25	$0.20	$0.20	$0.20	$0.20	$0.20	$0.20		*
41	New Richmond	Village	4 rooms or less, $3.00	$0.25		$4.00	‡				Lawn and street, 50 ft front or less $4.00 Each additional foot front. ..... .01	$2.00	$1.00		$0.10	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06		$14.00
42	North Baltimore	Private	3-4 rooms, $4.00 5-6 rooms, 6.00	$0.25		$3.00	$1.00	$2.00	$1.50		Lawn and street, 50 ft. front or less $6.00 Each additional foot front...... .. .05	$2.00	$2.00		$0.25	$0.25	$0.20	$0.18	$0.16	$0.16	$0.16	$10.00	$19.50
43	Plain City	Village	$6.00								With general use, lawn and street .$1.00				§								*
44	Pomeroy	Private	All services metered..												$0.30 to $0.25	$0.20	$0.15	$0.10	$0.09	$0.05	$0.05		*
45	Reading	Village	4 rooms or less, $3.50	$0.50	$3.50	$2.00	$1.00	$2.50	$1.00	$2.00	Street, 25 feet front or less . $1.50 Each additional foot front .02 Yard, 25 feet front or less.... 1.50 Each additional front, 20 ft deep .02 Each additional square yard. . . .005	$1.50	$1.00		$0.30 to $0.25	$0.20	$0.12½	$0.12½	$0.10	$0.10	$0.08		$19.72
46	Rockford	Village	5 persons or less, $4.00		$3.00	$3.00	$1.00	$4.00			Street, per foot front ..... $0.10 Lawn, 60 feet front or less........ 4.00	$2.50	$1.00		$0.30	$0.25	$0.15	$0.10	$0.09	$0.08	$0.07		$31.50
47	Sabina	Village	$6.00			$3.00		$3.00			Included in general use				$0.12½	$0.12½	$0.12½	$0.12½	$0.12½	$0.12½	$0.12½		$12.00
48	St Bernard	Village	4 rooms or less, $3.50	$0.50	$3.50	$2.00	$1.00	$2.50	$1.00	$1.50	Street, 25 feet front or less... . ..$1.50 Each additional foot front ..... .02 Lawn, 25 feet front or less. 1.50 Each additional foot front .... .02	$2.00	$1.00		$0.25 to $0.20	$0.15	$0.12	$0.12	$0.10	$0.10	$0.08		$17.50
49	Salineville	Village	3 rooms or less, $3.00 3-7 rooms, 6.00	$0.50		$3.00		$4.00	$3.00		Lawn, 40 feet front ....$3.00 40 to 60 feet front . .. . . 5.00 Street 1.25	$1.00	$1.00		$0.15	$0.15	$0.10	$0.08	$0.08	$0.08	$0.08		$19.75
50	Union City	Village	$5.00		$5.00	$3.00	$1.00	$3.00	$1.00		Lawn and street, 40 ft. front or less $3.00 Each additional lot 2.00	$3.50	$1.00		$0.50 to $0.25	$0.20	$0.15	$0.12½	$0.12½	$0.10	$0.08	$6.00	$18.50
51	Washington C. H.	Private	Only meter rates quoted												$0.35	$0.35	$0.22	$0.20	$0.16	$0.16	$0.16		*
52	Wellington	Village	All services metered.												$0.30	$0.30	$0.30	$0.30	$0.30	$0.30	$0.30		*
53	Winton Place	Village	2 rooms or less, $1.26	$0.28		$1.38	$1.38	$0.82	$0.82	$0.50	Street, per foot front... .. .. .016 Lawn per sq. yard 0028	$1.48	$1.18		$0.118	$0.118	$0.118	$0.106	$0.106	$0.098	$0.095		$16.72
54	Wyoming	Village	All services metered .												$0.30 to $0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$5.00	*
	Averages														$0.23	$0.19	$0.15	$0.14	$0.12	$0.12	$0.11		9 private $23.83 30 Pub, $17.43 Gen. Av. $18.93

† Residences with bath and water closets must be metered. ‡ Included with bath, water closet and basin § Not quoted. * Data not sufficient to estimate rate.

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TABLE VI—WATER RATES.

Number	Place	Ownership	Flat Rates House occupied by one family and supplied with one faucet	Each additional [illegible] room	Each additional family	One bath tub hot and cold	Each additional tub	One water closet	Each additional water closet	One wash basin	Sprinkling	Private stable, one horse and carriage	Each additional horse	Minimum	Meter Rates Rate per 1,000 gallons for a consumption in gallons per day of the following amounts 100 to 500	500 to 1,000	1,000 to 2,000	2,000 to 5,000	5,000 to 10,000	10,000 to 25,000	25,000 and over	Minimum rates	Specimen for comparison of rates [illegible] house [illegible] family. House provided with 1 bath tub 1 water closet 1 kitchen sink 1 yard hydrant [illegible] sprinkling lawn and street [illegible] feet [illegible] stable with 1 horse and carriage
1	Arlington Heights	Village	[illegible] rooms or less, $4 00	[illegible]		$1 00	$1 00	$2 50	$1 50	$2 00	Lawn and [illegible] 50x100 ft. $5 50 Each additional [illegible] front 0 02 Each additional [illegible] rear 100 ft. 0 01	$2 00			$0 40	$0 14	$0 13	$0 13	$0 13	$0 13	$0 13	$10 00	$17 50
[illegible]	Athens	Village	$5 00		$1 00	$1 00	$2 00	$3 00	$2 00	$1 00	Lawn 60 feet front or less $5 00 Each additional [illegible] front 05 Street [illegible] general use	$3 00	$1 50	$5 00	$0 30	$0 25	$0 20	$0 15	$0 1[illegible]	$0 08	$0 08	$5 00	$19 00
[illegible]	Berea	Village	$8 00	[illegible]							Lawn and street [illegible] front or less $6 00 Each additional [illegible] front 10	2 horses $6 00	$2 50		$0 30 to $0 20	$0 15	$0 10	$0 10	$0 10	$0 10	$0 10	$6 00	*
[illegible]	Bond Hill	Village	[illegible] metered												$0 30 to $0 25	$0 20	$0 12½	$0 10	$0 10	$0 10	$0 10	Meter rent, $1 20, $4 80	*
[illegible]	Bowling Green	Private	[illegible] rooms $4 00 [illegible] $6 00	[illegible]		$3 00	$1 00	$2 00	$1 50		Lawn and [illegible] front or less $4 00 Each additional [illegible] 1[illegible]	$2 00	$1 00		$0 30	$0 25	$0 20	$0 18	$0 16	$0 16	$0 14		$19 50
[illegible]	Cadiz	Village	[illegible] $5 00	$1 00		$2 00		$4 00	$4 00	$1 00	Lawn $0 [illegible] [illegible] general use	$2 00	$1 00		$0 30 to $0 20	$0 15	$0 12	$0 08	$0 05	$0 05	$0 05	$10 00	$18 00
	Caldwell	Village	[illegible] $1 [illegible]	$[illegible]	$1 50	$[illegible]	$1 00	$2 50	$1 00	$1 25	Lawn and [illegible] $2 00	$2 00	$1 00	$3 50	$0 15	$0 15	$0 12	$0 11	$0 08	$0 06	$0 06	$3 50	$1[illegible] 25
	Carthage	Village	[illegible] $4 00	[illegible]	$4 00	$2 00	$1 00	$2 50	$1 00	$2 00	Street [illegible] $3 00 Each additional [illegible] front 02 [illegible] 3 00 Each [illegible] 02 Each additional [illegible] 005	$2 50	$2 00		$0 30 to $0 25	$0 20	$0 12	$0 12	$0 10	$0 10	$0 08		$24 2[illegible]
[illegible]	Celina	[illegible]	[illegible]		$5 00	$3 00	$1 00	$2 50	$1 50		[illegible] front and [illegible] $[illegible] 00 Each additional [illegible] front 01	$2 50	$1 00		$0 40 to $0 08	$0 08	$0 [illegible]	$0 0[illegible]	$0 08	$0 08	$0 08	$15 00	$18 00
[illegible]	Chagrin Falls	[illegible]	[illegible]			$2 [illegible]	$1 00	$1 00			[illegible] general use $2 00	$[illegible] 00	$1 00		$0 25						$0 1[illegible]		$14 00
[illegible]	Chicago Junction	Village	[illegible] $1 [illegible]		$2 50	$2 00	$2 00	$2 00			[illegible] general use $2 00	$2 00	$1 00		$0 40	$0 25	$0 [illegible]	$0 10	$0 09	$0 08	$0 [illegible]		$12 25
[illegible]	[illegible]he	Private	[illegible]			$2 50	$2 50	$3 00	$1 00		[illegible] $5 00	$2 00			$0 20	$0 17	$0 15	$0 15	$0 15	$0 15	$0 15		$19 50
[illegible]	Clyde	Village	[illegible]			$3 00	$2 00	$2 00	$2 00		[illegible] $5 00	$2 00	$1 00		$0 20	$0 20	$0 [illegible]	$0 10	$0 07	$0 07	$0 1[illegible]		$13 00
[illegible]	College Hill	Village													$0 [illegible]	$0 3[illegible]	$0 [illegible]	$0 [illegible]	$0 25	$0 [illegible]	$0 [illegible]		*
[illegible]	Columbiana	Village	[illegible] $4		$2 00	$2 00	$2 00				[illegible] $5 00	$1 00	$1 00	$3 00	$0 08	$0 08	$0 08	$0 08	$0 08	$0 08	$0 08	$3 00	*
[illegible]	Corning	Village	Not used for domestic purposes																				*
[illegible]	[illegible]	Private	[illegible] rooms or less $5 [illegible]	$0 [illegible]	$5 00	$3 00	$1 00	$1 00	$1 00		[illegible] $5 00 [illegible] $6 00 [illegible] 1 00	$3 00	$2 00		$0 25	$0 [illegible]	$0 20	$0 15	$0 10	$0 1[illegible]	$0 [illegible]	$5 00	$43 00
18	East Palestine	Village	[illegible] $4 00	[illegible]		$2 00	$2 00	$2 00	$2 00		[illegible] $3 00 [illegible] [illegible] 1 00 [illegible]	$1 00	$1 00	$4 00	$0 15	$0 15	$0 15	$0 15	$0 15	$0 15	$0 15	$4 00	$18 78
19	Elmwood Place	Village	[illegible] $[illegible]	[illegible]	$3 50	$2 00	$1 00	$2 50	$1 00	$1 00	[illegible] $1 [illegible] [illegible] [illegible] front [illegible] 1 [illegible] [illegible]	$1 50	$1 00		$0 30 to $0 25	$0 2[illegible]	$0 12½	$0 12½	$0 10	$0 10	$0 08		$16 00
[illegible]	Galion	Private	[illegible]	[illegible]		$4 00	$2 00	$1 00	$2 00		W[illegible] [illegible] front [illegible] [illegible] additional feet front [illegible]	$3 00	$2 00	$5 00	$0 25	$0 [illegible]	$0 10	$0 10	$0 10	$0 10	$0 10	$1[illegible] 00	$24 32
21	Gibsonburg	Village	$3 [illegible]			$2 00	$2 00	$2 00	$2 00		Lawn and street [illegible] $[illegible] Each additional [illegible] feet front [illegible]	$2 00 1st add $1 00	$0 50		$0 20	$0 [illegible]	$0 14	$0 10	$0 08	$0 08	$0 08	$3 00	$11 00
22	Glendale	Village	[illegible] $1 [illegible]	$0 50		$3 00	$2 00	$3 00	$2 00	$1 00	Lawn [illegible] $1 00 Each additional [illegible] square feet 01 Street, 50 feet front or less 3 00 Each additional [illegible] front 02	$2 50	$1 00	$4 00	$0 40 to $0 25	$0 2[illegible]	$0 12½	$0 12½	$0 10	$0 10	$0 10	$20 00	$31 50
[illegible]	Glouster	Village	Not used for domestic purposes								Lawn and street with use in stables $5 00				§								*
[illegible]	Greenwich	Village	[illegible]	$0 50		$2 00					Lawn and [illegible] or less $1 00 Each additional [illegible] front 05 Gardens 2 00	$2 00	$1 00		§								*
[illegible]	Hartwell	Village	[illegible]		[illegible] increase	$2 00	$1 00	$2 50	$2 00	$1 00	Lawn 50x1[illegible] $3 50 Each additional [illegible] front 02 Street per [illegible] front 10	$2 50	$1 00		$0 15	$0 1[illegible]	[illegible]	$0 1[illegible]	$0 12	$0 1[illegible]	$0 08		$22 00
[illegible]	Hiram	Village	$6 00		$6 00	$2 00		$2 00			Lawn and [illegible] $2 00 [illegible] 1 00	$2 00 1st add $2 00	$1 00		$1 50	$0 [illegible]	$0 50	$0 50	$0 50	$0 50	$0 50		$16 00
[illegible]	Jackson	Private	$[illegible] 00			$4 00		$4 00		$2 00	Lawn and s[illegible] $6 00	$3 00	$1 00		$0 35	$0 35	$0 30	$0 20	$0 18	$0 15	$0 15		$35 00
[illegible]	Kent	Private	[illegible] $1 [illegible]	$0 62½		$2 50		$2 50		$1 50	Lawn and [illegible] front or less $3 00 100 ft. front or less 4 00 Each additional feet front 05	$1 25	$1 25		$0 16	$0 16	$0 16	$0 16	$0 16	$0 13	$0 12½ $0 09		$17 62
[illegible]	Lakeside	Private	$3 00			$1 00		$2 00			Street only [illegible] 3 00				§							Rates are for season	*
[illegible]	Leetonia	Village	[illegible] $5 [illegible]	$0 50		$3 00		$3 00			Lawn 40 feet front or less $1 00 40 [illegible] front 4 00 Each additional [illegible] front 02 Street 2 00	$1 00	$1 00		$0 15	$0 1[illegible]	$0 15	$0 15	$0 10	$0 08	$0 05 to $0 01		$19 50
[illegible]	Lodi	Village	[illegible] $4 00	$0 25	$4 00	$3 00	$1 00	$2 00	$1 00		Street per [illegible] $0 25 Lawn 50 [illegible] 1 00 Each additional feet front 05	$2 00	$1 00		$0 30	$0 25	$0 15	$0 10	$0 09	$0 08	$0 07		$27 50
[illegible]	Lockland	Village	[illegible] rooms or less $3 50	$0 50	$3 50	$2 00	$1 00	$2 50	$1 00		Lawn 50 ft. front 150 ft. deep $3 00 Each additional feet front 02 Each additional 100 square feet 01½ Street 25 feet front or less 1 50 Each add'l ft. front 02	$2 00	$1 00		$0 40 to $0 25	$0 [illegible]	$0 12½	$0 12½	$0 10	$0 10	$0 08		$17 00
[illegible]	Logan	Village	$1 [illegible]			$3 00	$1 00	$2 [illegible]	$1 00		Lawn and [illegible] include [illegible] general use	Included in general use			$0 [illegible] to $0 10	$0 08	$0 08	$0 08	$0 08	$0 08	$0 08		$9 00
[illegible]	Marysville	Private	[illegible]	$0 50	$5 00	$3 00	$1 00	$4 00	$3 00		Lawn and [illegible] or less $5 00 Each additional [illegible] front 06	$1 00	$1 00		$0 25	$0 25	[illegible]	$0 11 [illegible]	$0 05	$0 05	$0 [illegible]	$5 00	$19 00
[illegible]	Medina	Village	$6 00			$2 00	$2 00	$3 00	$1 00		Lawn [illegible] $5 00 Each additional [illegible] Street [illegible] front or less [illegible] Each additional feet front 06	$1 50	$1 00		$0 15	$0 15	$0 12	$0 10	$0 07	$0 06	$0 06		$26 10
[illegible]	Middleport	Private	All services metered												$0 [illegible] to $0 [illegible]	$0 20	$0 17	$0 1[illegible]	$0 09	$0 05	$0 05		*
[illegible]	Milan	Village	[illegible] rooms or less $[illegible]		$5 00	$[illegible] 00		$1 50			Street [illegible] front or less $2 00 Each additional [illegible] feet front [illegible] Lawn [illegible]	$1 00	$1 50		§								$16 40
[illegible]	Milford Center	Village	$[illegible]			$1 00	$1 00	$1 00	$1 00	$1 00	With general [illegible] lawn and street $2 00	$4 00			§								$13 00
[illegible]	Mingo Junction	Private	3-4 rooms $[illegible] 5 to 7 rooms 10 00 8 to 10 rooms 1[illegible]	[illegible]		$1 50		$3 00	$2 50	$1 50	Lawn [illegible] $3 [illegible] [illegible] 1[illegible] [illegible] 7 00	$2 50	$2 00		§								$27 00
[illegible]	Mt. Sterling	Village	$5 [illegible]			$4 00	$1 00				[illegible] $3 [illegible]	$1 00	$1 00		$0 25	$0 20	$0 2[illegible]	$0 [illegible]	$0 20	$0 20	$0 20		*
[illegible]	New Richmond	Village	[illegible] rooms or less $3 00			$4 00	‡				Lawn [illegible] $4 00 Each additional feet front 01	$2 00	$1 00		$0 [illegible]	$0 08	$0 08	$0 08	$0 06	$0 06	$0 06		$14 00
[illegible]	North Baltimore	Private	[illegible] room $4 00 [illegible] room 6 00			$3 00	$1 00	$2 00	$1 50		Lawn [illegible] 50 ft. front [illegible] $5 00 Each additional [illegible] front 05	$[illegible]	$2 [illegible]		$0 25	$0 2[illegible]	$0 [illegible]	$0 18	$0 16	$0 16	$0 16	$1 00	$10 50
[illegible]	Plain City	Village	$[illegible]								With [illegible] lawn and street $1 00				§								*
[illegible]	Pomeroy	Private	All services metered												$0 30 to $0 25	$0 20	$0 15	$0 10	$0 0[illegible]	$0 05	$0 05		*
[illegible]	Reading	[illegible]	[illegible] $5 [illegible]		$[illegible]	$[illegible]	$1 [illegible]	$2 50	$1 00	$2 00	Street [illegible] $1 50 [illegible] front [illegible] Yard [illegible] 1 50 [illegible] front 20 ft. deep [illegible] [illegible] square yard [illegible]	$1 50	$1 00		$0 30 to $0 25	$0 20	$0 1[illegible]	$0 12½	$0 10	$0 10	$0 08		$19 7[illegible]
[illegible]	[illegible]	Village	[illegible] $1 00		$1 00	$3 00	$1 00	$1 00			Street per [illegible] $0 10 Lawn [illegible] front or less 1 00	$[illegible] 50	$1 00		$0 30	$0 2[illegible]	$0 15	$0 10	$0 0[illegible]	$0 08	$0 [illegible]		$21 50
[illegible]	Salem	Village	$[illegible]			$3 [illegible]		$7 00			Included [illegible] general use				$0 12½	$0 12½	$0 1[illegible]	$0 12½	$0 12	$0 12½	$0 12		$12 00
[illegible]	St. Bernard	Village	[illegible] rooms or less $1 50	[illegible]	$3 50	$2 00	$1 00	$2 50	$1 00	$1 50	Street 25 [illegible] $1 50 Each additional feet front 02 Lawn 25 [illegible] 1 [illegible] Each additional feet front 02	$2 00	$1 00		$0 [illegible] to $0 30	$0 25	$0 12	$0 12	$0 10	$0 20	$0 08		$17 50
[illegible]	Salineville	Village	[illegible] rooms or less $3 00 7 rooms 6 00	$0 [illegible]		$3 [illegible]		$3 00	$3 00		Lawn 40 ft. front $4 00 40 [illegible] feet front 5 00 Street 1 25	$1 00	$1 00		$0 25	$0 15	$0 10	$0 08	$0 08	$0 08	$0 08		$19 75
[illegible]	Union City	Village	$5 00		$5 00	$3 00	$1 00	$3 00	$1 00		Lawn and street 40 ft. front or less $1 00 Each additional [illegible] 2 00	$2 50	$1 00		$0 [illegible] to $0 25	$0 20	$0 15	$0 12½	$0 12½	$0 10	$0 08	$6 00	$18 50
[illegible]	Washington C. H.	Private	Only meter rates quoted												$0 35	$0 35	$0 [illegible]	$0 20	$0 16	$0 16	$0 16		*
[illegible]	Wellington	Village	All services metered												$0 30	$0 30	$0 30	$0 30	$0 30	$0 30	$0 30		*
[illegible]	Winton Place	Village	[illegible] rooms or less $1 3[illegible]	$0 [illegible]		$1 38	$1 [illegible]	$0 [illegible]	$0 62	$0 50	Street per [illegible] front .016 Lawn per sq. yard .0038	$1 48	$1 48		$0 118	$0 118	$0 11[illegible]	$0 106	$0 106	$0 09[illegible]	$0 09[illegible]		$16 7[illegible]
[illegible]	Wyoming	Village	All services metered												$0 30 to $0 10	$0 10	$0 10	$0 11	$0 10	$0 10	$0 10	$5 00	*
	Averages														$0 21	$0 19	$0 15	$0 14	$0 1[illegible]	$0 12	$0 11		9 private $21 83 30 Pub. $17 4[illegible] Gen. Av. $18 93

† Residences with bath and water closets must be metered. ‡ Included with bath, water closet and basin. § Not quoted. * Data not sufficient to estimate rate.

Bowling Green has just installed her system of sanitary sewers so that it has not come into general use as yet. As there is no large stream available for dilution and purification will be required as soon as the amount of sewage increases it has been attempted to put off this necessity for purification by keeping all solid matter out of the sewers and allow them to carry away only the liquid portion. This is to be accomplished by placing on each service line a catch basin which will retain a considerable portion of the solids. These basins are to be about three feet in diameter by six feet high constructed of brick laid in cement. They will be placed on private property or, where necessary, under the sidewalk and will be provided with tightly covered manholes for cleaning. It is proposed to clean them every six months or oftener if necessary.

In Caldwell, as in a number of other cases, there are no public sewers for house and closet drains, but there are, however, a number of private sewers put in by the several property owners, which carry more or less sewage to the streams and ditches.

Celina will shortly have a new system of sanitary sewers with a disposal works to purify the sewage before sending it to Beaver Creek, a branch of the Wabash River.

Chagrin Falls is one among a number of villages which have put in a few sewers to care for the storm water of the place but have since allowed closets, cesspools, etc., to be connected to them. Here, as in nearly every case, this arrangement causes a serious nuisance in warm weather. The storm sewers are not designed to care for the small flow from the few connections; they frequently lead to some dry ditch or run; often have untrapped openings to the streets and gutters; and often they include open ditches for part of their length; all these features tend to cause a very objectionable condition of affairs. Here in Chagrin Falls a ditch which has been partially arched over and maintained as a storm sewer, is the receptacle for filth of all kinds, and is bitterly complained of by the people so unfortunate as to reside along the open stretches.

The sanitary sewers of Chillicothe have a temporary outlet to the Scioto River, but they are so designed that the sewage can be diverted to the low land along Paint Creek for purification when the necessity arises.

Clyde has 1.3 miles of combined sewers to which some 40 percent of the people are accessible. There are some 100 connections to these sewers, giving some 500 people or 20 percent of the total population the use of same. All of the sewers, with the exception of one short piece on Buckeye Street, connect with an outfall sewer which leads to a disposal works northwest of the village along Raccoon Creek. The Buckeye sewer is said to receive the drainage from only a few vaults and to cause no nuisance, though some were found who complained of it. It empties into Raccoon Creek direct as it was too low to be brought into the general system.

The outlet of the system was formerly Raccoon Creek, but in 1898 it became necessary to put in a purification works of some kind as the creek was no longer able to care for the sewage in the dry season. An intermittant filtration works was decided upon and twenty acres of land, lying on both sides of the creek and north of the Maumee turnpike, were purchased.

To reach this farm, the old outfall sewer was intercepted in the village and a new 12-inch outfall carried down at such a grade as to allow four feet, if necessary, for the thickness of the filter beds. The old outlet is still in use as a storm overflow and relief to the new diverter. Coarse solid matter is kept out of both diverter and the old sewer by a fine screen placed in the latter above the former. The soil of the farm secured consists of a sandy loam with an admixture of silt from the creek channel and some quicksand washed in from the territory above. The beds are placed to the east of the creek and in quite a bend so that they are practically surrounded on three sides by the stream. Six beds have been laid out comprising in all an effective area of 3¼ acres. These beds are separated from each other and from the creek by earthen embankments, formed of the local soil, which is rather easily washed. The beds are three feet thick and are underdrained by agricultural tile placed in lines some twenty feet apart.

These underdrains are continuous from bed to bed and finally join the main underdrain which follows the outer or creek side of the beds. The distributors are contained in the embankments of the beds, the latter being so graded as to give a good fall to all the lines. On the distribution system there are six square chambers provided with suitable iron grates so that the sewage can be conducted to any desired bed. These same chambers also act as settling basins and require to be cleaned out.

The sewage is discharged upon each of the beds through about eight 6-inch tiles, leading from the distributors in the embankments. These discharge the sewage in such a stream that the bed is badly washed, as the latter has no protection of any kind to prevent same.

Sufficient elevation was retained in the distributing system to carry the sewage across the creek to new beds if the present area is inadequate.

While the design and construction of the plant are such as would make it possible to secure a good effluent, the beds have been so neglected that such a result is certainly not now secured. During the summer of 1901 the beds were so overgrown with grass and weeds that the division lines could hardly be recognized. At the same inspection three beds were found to be flooded with sewage in an advanced state of decomposition, one was so overgrown with weeds that it could not have received much sewage for a considerable length of time, while two beds were receiving sewage and were already partially flooded.

A later inspection showed that some attention had been given the plant as the weeds and grass were cut, but the condition of the beds them-

TABLE VII — SEWERAGE OF TOWNS.

Number	Place	Population	Kind or System of Sewers	Method of disposal	Outlets for Sewers, or Surface Drains.	Number of miles of sewers	Per cent. of population accessible to sanitary, combined or private sewers	No. of closet or vault connections to sewers, including private sewers.	Estimated population using sewers	Per cent of total population using sewers	Does the sewage cause a nuisance	Remarks.
1	Arlington Heights	360	Combined	Dilution	Mill Creek	0.3	10	0	0	0	No	
2	Athens	3,066	Sanitary	Dilution	Hocking River	3 5	75	400	2,000	65	At times	A few short storm sewers, nearly all surface water carried off in gutters
3	Berea	2,510	Combined	Dilution	Rocky River	4 0	65	15	150	6	Very little	
4	Bond Hill	1,081	None		Mill Creek		0	0	0	0		
5	Bowling Green	5,067	Separate	Dilution	Poe ditch to Portage River	Storm, 5.0 Sanitary, 3.5	75	75	500	10	Not as yet	Purification to be required.
6	Cadiz	1,755	None		Short Creek		0	0	0	0		
7	Caldwell	927	Storm	Dilution	Duck Creek	0.5	5	10	50	5	Very little	Private sewers
8	Carthage	2,559	Combined	Dilution	Mill Creek	0 8	10	2	15	1	No	
9	Celina	2,815	Combined	Dilution	Beaver Creek	1.5	20	30	200	7	In summer and fall	New system under way.
10	Chagrin Falls	1,586	Combined	Dilution	Chagrin River	0.5	20	10	50	3	In summer and fall	Sewers put in for storm water.
11	Chicago Junction	2.348	Storm	Dilution	Huron River	0.5	0	0	0	0	No	
12	Chillicothe	12,976	Separate	Dilution	Scioto River	Storm, 1 3 Sanitary, 3.2	15	15	750	6	No	Purification to be required.
13	Clyde	2,515	Combined	Intermittent filtration	Raccoon Creek	2 0	40	100	500	20	At times	Nuisance caused from neglect of disposal works
14	College Hill	1,104	None		Mill Creek		0	0	0	0		
15	Columbiana	1,339	None		Mill Creek to Mahoning River		0	0	0	0		
16	Corning	1,401	None		Hocking River		1	1	15	1	At times	Private sewer
17	Delaware	7,940	Combined	Dilution	Olentangy River	0 7	15	10	400	5	In summer and fall	Sewers put in for storm water only Sanitary system under way
18	East Palestine	2,493	Combined	Dilution	Branch of Beaver Creek	0 6	20	12	75	3	In summer and fall	
19	Elmwood Place	2,532	Storm	Dilution	Mill Creek	3 0	0	0	0	0	No	
20	Galion	7,282	Combined	Dilution	Olentangy River	3.0	20				At times	No data available as to extent sewers are used. New system under way
21	Gibsonburg	1,791	Storm	Dilution	Sugar Creek	0 5	0	0	0	0	No	One cesspool drains to sewer
22	Glendale	1,545	Combined	Dilution	Mill Creek	0 5	10	10	75	5	At times	Sewers put in for storm water only.
23	Glouster	2,155	None		Sunday Creek		2	6	10	2	At times	Private sewers
24	Greenwich	849	Storm	Dilution	Branch Vermillion River	1 5	0	0	0	0	No	
25	Hartwell	1,833	Combined	Dilution	Mill Creek	2.0	30	5	20	1	At times	Sewers put in for storm water only
26	Hiram	659	None		Branch Mahoning River		0	0	0	0		Water closets drain to cesspools which overflow to ditches
27	Jackson	4,672	None		Salt Creek		0	0	0	0		Water-works just installed
28	Kent	4,541	None		Cuyahoga River		7	45	300	7	At times	Private sewers
29	Lakeside	1,000	Sanitary	Dilution	Lake Erie	1 5	80	100	500	50	No	
30	Leetonia	2,741	Combined	Dilution	Branch Beaver Creek	0 2	15	30	200	7	At times	
31	Leipsic	1,726	Combined	Dilution	Branches of Portage River.	1 0	10	6	50	3	In summer and fall	Sewers put in for storm water only
32	Lockland	2,[illegible]	None		Mill Creek		0	0	0	0		A number of closets drain to cesspools
33	Logan	3,480	Separate	Dilution	Hocking River	Storm, 0 8 Sanitary 9 2	90	87	450	13	At times	
34	Marysville	3,048	Sanitary	Dilution	Mill Creek to Scioto River			25	200	7	At times	No data available as to extent of sewers
35	Medina	2,232	Combined	Dilution	East Branch Rocky River	0 2	10	12	60	3	In summer	Nearly all closets lead to cesspools, draining to sewers
36	Middleport	2,799	Combined	Dilution	Ohio River	0 6	10	20	150	6	No	
37	Milan	653	Storm	Dilution	Huron River	0 2	0	0	0	0	No	
38	Milford Center	682	Combined	Dilution	Big Darby Creek	1 0	20	6	40	6	At times	
39	Mingo Junction	2 954	Combined	Dilution	Cross Creek to Ohio River	0.6	20	10	75	3	No	
40	Mt Sterling	986	None		Deer Creek		2	3	[illegible]	2	No	Private sewers
41	New Richmond	1,916	None		Ohio River		0	0	0	0		
42	North Baltimore	3,561	Combined	Dilution	Branch Portage River			75	150	13	At times	No data available as to extent of sewers
43	Plain City	1,432	Storm	Dilution	Big Darby Creek	0 5	0	0	0	0	No	
44	Pomeroy	4,639	Storm	Dilution	Ohio River	0 5	6	50	300	6	No, except where sewage fails to reach the river channel	Private sewers
45	Reading	3,076	None	Dilution	Mill Creek		1	6	30	1	At times	Private sewers
46	Rockford	1,207	Combined	Dilution	St Marys River	0 3	10	6	40	3	But little	
47	Sabina	1,481	Storm	Dilution	Wilson Creek	2 5	0	0	0	0	No	
48	St Bernard	3,384	None		Mill Creek		0	0	0	0		
49	Salineville	2,353	None		Yellow Creek		3	10	75	3	In summer	Private sewers
50	Union City	3,998	Combined	Dilution	Branches of Wabash River	3 5	30	100	500	8	In summer and fall	
51	Washington C H	5,751	Combined	Dilution	Paint Creek	3 5	20	100	800	11	In summer	
52	Wellington	2,094	None		Branch of Black River		0	0	0	0		
53	Winton Place	1 219	None		Mill Creek		0	0	0	0		
54	Wyoming	1,450	Storm	Dilution	Mill Creek	1 5	0	0	0	0		Closets drain to cesspools
	Total Sewered in part Sewered in part, including private sewers Not sewered	144,261 89,729 109,807 34,454	Combined, 21 Sanitary and separate, 6 Storm, 10 None, 17	1 purification plant Remainder dilution		Total combined, 28 8 Total sanitary, 20 9 Total combined and sanitary, 48 2 Total storm, 18 3 Ave sewered towns, 1 9 Ave for all, 9	Ave for sewered towns, including private sewers, 23 Ave for all, 15	Total, 1,547 Ave for sewered towns, 47 Ave for all, 29.	Total, 9,090 Ave. for sewered towns, 275 Ave for all, 171.	Ave for sewered towns, 9 Ave for all, 6	More or less, 27 None, 15 No sewers, 12	

Per cent. total population accessible to sewers, 16 2 Per cent. population of towns with any sewers, except storm, accessible to same, 21 3. Per cent population of towns with public sewers, accessible to same, 20.1 Per cent. total population using sewers, 6.2 Per cent total population of towns with any sewers, except storm, using same, 8.2 Per cent. total population of towns with public sewers, using same, 10.1. Per cent. population accessible to sewers, using same, 38 7 selves showed even more neglect. At this later time four of the beds were flooded with very foul sewage, one was overgrown with grass and weeds showing that it had not been in use for some time, and one bed was covered with a thick sludge which had dried out and cracked in the sun. The effluent was decidedly objectionable, though fairly clear, and was leaving a very foul deposit in the short channel leading to the creek. The condition of the stream was already so foul with the refuse from canning and kraut factories that the influence of the effluent was entirely lost as far as the eye could judge. Considering the nature and area of the beds, it does not seem possible, with any ordinary care, that this plant could get into such a condition as described, with the amount of sewage now sent to it. Even if the 12-inch sewer ran full all the time it could hardly overwork the beds if they were properly cared for.

In an intermittent filtration plant it is certainly necessary to keep the surface of the beds properly graded so that the sewage will spread evenly over the surface and to keep it free from sludge, etc., so that the sewage can easily pass through the bed and not be held on the surface for periods so great as to allow the sewage to putrefy. Then a proper rotation must be kept up with the beds so that while one or more are receiving sewage the others will be aerating and drying out so that the surface can be freed from sludge and worked over.

It seems advisable here to call attention to the fact that a sewage disposal works must receive the attention its method of operation demands and that the cost of construction is not the only cost, but that there is a certain additional charge for maintenance which must be met if the plant is to be successful. On account of the neglect of this feature Clyde has a sewage disposal works which causes a constant nuisance and is continually polluting Raccoon Creek, while if properly tended, it would at no time be objectionable and would prevent any further pollution of the stream. From November to April it is claimed that a by-pass is used to discharge the sewage direct to the creek and that none of it is sent to the filters during this period.

Delaware has at present a few combined sewers and a number of private sewers draining to Delaware Run and the Olentangy River.

A new sanitary system is under way, which when completed, will carry its sewage to a disposal works just south of the city. Here the sewage will be treated by the septic tank and coke bed contact system.

In Glendale a short sewer put in for storm water only has been used for closet drainage, causing, it is claimed, a serious nuisance.

Hiram has about 15 water-closets which are sewered to cesspools, the latter draining to small ditches.

Much sewage is sent to the Cuyahoga River from the private sewers of Kent. Such a nuisance is caused by these small drains, that the question of a complete system has been agitated but without success as yet.

Leipsic is having much trouble from sending sewage to the small ditches which form the head waters of the Portage River.

Logan has the most complete system of sewers of the group. It is estimated that 90 percent of the people of Logan are accessible to the sanitary sewers. They are not as yet, however, in very general use.

Marysville has a number of sanitary sewers in the central portion of the village, but no data could be secured as to their extent.

It was also impossible to secure data as to the extent of the combined sewers in North Baltimore.

The sewage of Washington C. H., together with the manufacturing refuse, causes a very much complained of nuisance in Paint Creek.

From a summary of Table IV. it is seen that in the fifty-four towns given, twenty-one have more or less extensive systems of combined sewers. Six have either the sanitary alone or the separate systems, ten have only storm sewers and seventeen have no sewers whatever. The above statement must be modified as eight of the towns with none, or only storm sewers, have a number of private sewers which carry drainage from closets to the various streams.

The total population of these fifty-four towns is 144,261, of which 89,729 is in towns provided with at least some public sewers, 109,807 is in towns provided with either public or private sewers, and 34,454 is in towns with no sewers whatever except for storm water.

With one exception all the sewage is cared for by dilution.

The average mileage of both sanitary and combined sewers is very small, being for sewered towns only 1.9 miles and for all only 0.9 miles.

For sewered towns, including those with private sewers, the average percent of population accessible is twenty-three, while for all towns it is only 15 percent.

The total number of people using the sewers is 9080, which is only 275 for the sewered towns and 171 for all.

The average percent of the population using sewers, is for sewered towns only 9 and the average percent for all towns is 6.

The table shows that in 27 towns the sewage causes a more or less of a nuisance, that in 15 it is not as yet complained of, while 12 places have no sewers whatever to give trouble.

The percent of the total population accessible to the sewers is 16.2, while the percent of the total population in towns with any sewers, except storm, which are accessible to these sewers is 21.3, and the percent of the total population of towns with public sewers which are accessible to same, is 26.1.

The percent of the total population using the sewers is 6.2, while the percent of the total population in towns with any sewers, which have the use of same is 8.2, and the percent of the total population of towns with public sewers which have the use of same is 10.1.

The percent of the total population accessible to the sewers and which make use of same is 38.7.

As in the previous compilations of this kind which have been made on other towns of Ohio, it is found that there is but a small percent of the total population which are accessible to the sewers and that also a very small percent make use of these sewers, even if they are accessible to same.

APPENDIX III.

STREAM GAGING

STREAM GAGING.

It is possible to present this year the results for the Maumee River only, the unfortunate death of Professor C. N. Brown having delayed the work on the Scioto and Olentangy Rivers to such an extent that the results for these two streams could not be made available for this report but must be postponed for the annual report of 1902.

MAUMEE RIVER.

The gaging station for this stream is located at Waterville, the lowest available point on the river where the water level is not influenced by the backwater from Lake Erie. The gage is read twice daily and the mean of these two readings used in computing the mean daily discharge in cubic feet per second. These results are then tabulated in accord with the standard forms of the United States Geological Survey, and appear in Tables I. and II. and in Plate 1. The rainfall statistics in Table I. are obtained from the reports of the United States Weather Bureau, the value of which in this work is inestimable. The rainfall table gives the mean annual rainfall for the watershed as 30.89 inches which is 1.45 inches less than the rainfall for 1899 and 3.76 inches less than that for 1900.

As is to be expected this lower rainfall is accompanied by a falling off in the run-off, the figure being 19.9 percent as against 22.7 percent and 29.9 percent for 1899 and 1900 respectively.

To prevent over valuation of these results it must be noted as previously stated, that the canal system takes a small amount of water from above the gaging station and returns some of it below this station. On the extreme low flows this may have some influence but it is not believed that it is extensive.

TABLE I — RAINFALL ON MAUMEE WATERSHED — 1901.

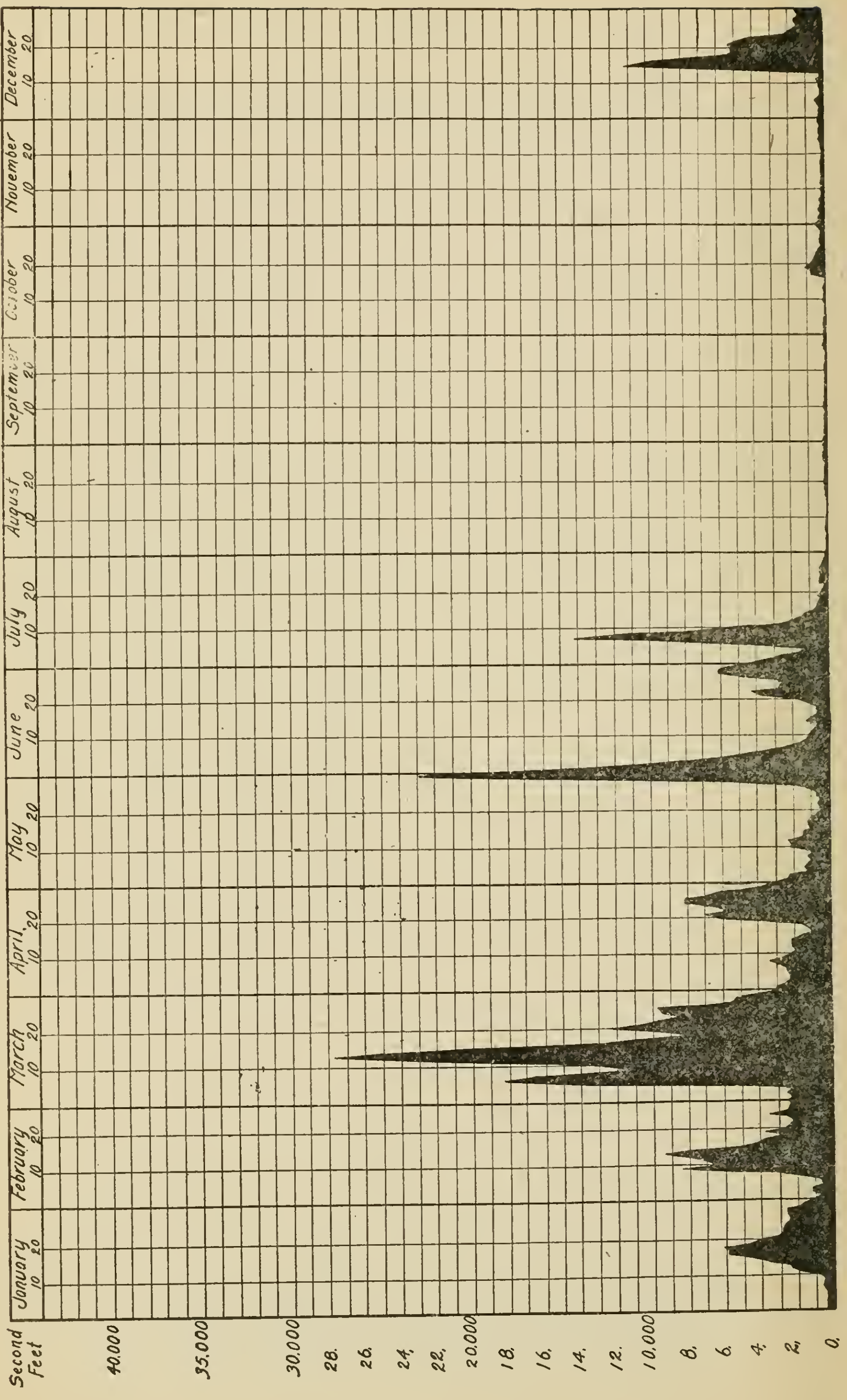
Station.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Angola	3.19	1.93	3.26	2.54	2.75	4.10	5.95	4.58	0.87	6.15	1.81	3.47	40.60
Auburn	1.58	1.44	1.15	1.94	2.45	2.87	1.38	3.71	1.30	3.71	1.15	1.57	24.25
Bluffton	1.17	0.93	2.76	2.34	4.16	3.29	1.23	4.79	1.12	3.40	1.50	4.01	30.70
Ft. Wayne	1.49	1.74	......	......	......	......	......	......	......	......	......	......	......
Adrian	2.12	1.31	2.37	1.33	2.53	2.23	1.75	2.05	0.97	3.46	1.89	2.91	24.92
Coldwater	2.79	1.75	2.71	2.18	1.78	4.96	4.67	4.10	0.73	6.56	1.82	3.25	37.30
Hillsdale	2.53	2.63	2.95	1.98	2.64	3.55	2.68	2.20	0.93	5.63	2.00	3.12	32.84
Benton Ridge	1.42	2.10	3.15	2.03	3.70	3.59	2.66	2.02	1.82	0.24	......	3.59	......
Bowling Green	2.57	1.30	2.86	2.23	4.91	3.98	4.42	4.38	1.32	1.15	2.33	4.21	35.66
Celina	1.74	0.80	3.14	2.27	4.79	3.98	3.24	1.86	1.95	0.94	0.95	3.58	29.24
Defiance	1.10	1.07	2.35	1.87	3.93	3.47	6.08	2.16	1.54	2.63	1.41	4.14	31.75
Findlay	1.46	1.45	3.30	2.46	4.65	2.79	1.36	2.96	1.85	0.86	0.94	3.87	37.95
Hedges	1.12	1.03	3.02	2.19	5.28	3.26	1.89	2.25	1.76	2.27	1.35	4.03	29.45
Kenton	2.61	......	......	......	......	......	......	......	......	......	......	......	......
Leipsic	1.33	1.70	2.20	1.81	3.95	3.95	3.20	2.14	......	1.22	1.01	4.43	......
Montpelier	3.30	1.70	2.44	2.82	3.52	4.01	5.07	2.45	0.82	4.09	1.71	3.10	35.03
Napoleon	1.58	1.25	2.51	2.01	4.03	5.10	2.98	2.53	0.64	1.73	1.27	3.02	28.65
New Bremen	1.28	0.77	1.26	2.11	4.67	5.14	1.68	2.11	1.44	1.09	1.25	3.75	26.55
Ottawa	1.64	1.26	2.60	2.34	4.32	2.46	3.32	2.61	1.61	0.59	1.64	2.25	27.64
Swanton	2.01	1.44	2.05	2.12	3.58	6.68	3.71	2.55	1.32	1.36	1.92	3.88	32.62
Van Wert	1.68	1.46	2.04	2.11	6.63	2.32	1.63	1.50	1.74	2.24	1.28	4.64	29.27
Wauseon	2.10	1.38	3.57	2.99	3.67	5.15	2.36	1.93	1.95	2.88	1.61	5.73	35.32
Total	41.81	30.44	51.69	43.67	77.94	76.88	61.26	54.28	25.68	51.96	29.14	72.55	......
Mean	1.90	1.45	2.58	2.18	3.90	3.84	3.06	2.74	1.35	2.73	1.53	3.63	30.89

TABLE II — MONTHLY DISCHARGE OF MAUMEE RIVER AT WATERVILLE — 1901.

Drainage area, 6,111 square miles.

Month.	Discharge in second-feet.			Total in acre-feet.	Run off.			
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.	Rainfall in inches.	Per cent.
January ..	6,110	480	2,389.7	146,937	.391	.451	1.90	23.7
February .	9,450	580	3,716.8	206,421	.608	.633	1.45	43.6
March	27,600	2,240	11,207.9	689,147	1.834	2.114	2.58	81.9
April	8,160	1,020	3,646.3	216,970	.596	.658	2.18	30.2
May	22,750	530	3,147.9	193,557	.515	.594	3.90	15.3
June	15,220	660	3,599.0	214,155	.589	.657	3.84	17.1
July	14,215	80	2,503.1	153,910	.410	.473	3.06	15.5
August ...	140	5	47.7	2,935	.008	.009	2.74	00.3
September	80	10	42.0	2,499	.007	.008	1.35	00.6
October ..	1,020	10	246.1	15,132	.040	.046	2.73	01.7
November	180	60	98.0	5,831	.016	.018	1.53	01.2
December	11,200	110	2,585.8	158,995	.423	.488	3.63	13.5
Year	27,600	5	2,771.2	2,006,489	.453	6.149	30.89	19.9

PLATE I



DAILY DISCHARGE OF MAUMEE RIVER AT WATERVILLE —1901

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